Canadian Journal of
PUBLIC HEALTH

VOLUME 34
NUMBER 10

TORONTO
OCTOBER, 1943

Firm Foundations First*

V. R. SMITH

General Manager of the Confederation Life Association
Toronto

MAY I begin, Mr. Chairman, by thanking you for your invitation to address a few remarks to the Canadian Public Health Association on the proposed plans of health insurance for Canada. I am glad to be here because it gives me the opportunity to praise, publicly, the submission you made last May to the Special Committee of the House of Commons on Social Security. It is one of the very best submitted, and we, as life insurance men, echo and re-echo your insistence upon the pre-eminence of preventive health measures. We believe that you are on sound ground in voicing the principles of your submission and that they are essential conditions to the successful achievement of our common ideal of a Canada made up of healthy, fit and resourceful men and women, and children too.

With your submission that "it is illogical to allow preventable diseases to continue to occur and *then* have to provide for all the *costs* and *suffering* associated with treatment," there can be no disagreement. Unfortunately, as your brief points out, "health insurance measures in effect in various countries have related almost exclusively to the treatment of sick persons and the provision of assistance while they are unable to work." This is "sickness insurance"—merely provision for medical care and sick benefits. With your conception of health insurance, the life insurance companies are in full agreement. If anything I can say to-day will assist to advance the hour when your conception becomes the reality and not the vision, I shall be more than repaid.

I take it for granted, Mr. Chairman, that you have arranged a wide distribu-

**An address given at the wartime conference and thirty-second annual meeting of the Canadian Public Health Association, held in Toronto on October 4 and 5, 1943.*

tion, throughout every part of Canada, of your printed brief. Nevertheless, there must be continuous reiteration of the principles you enunciate if the public is to know them, to understand them and to accept them to the point of their adoption. We trust, therefore, that you will continue, in season and out of season, to state and restate your fundamental principles of prevention. The old adage still holds true, "An ounce of prevention is worth a pound of cure," or, as the surgeons might say, "A stitch in time saves nine."

I cannot refrain from referring to the wise remark of Dr. Gordon Bates when recently he said at Niagara Falls, "I commend to you a vision of Canada in which the health of all Canadians is a national objective, a Canada in which the minimum amount is spent on sickness and funerals, a maximum on the prevention of sickness of all kinds, mental, moral and physical."

We in the life insurance business believe these objectives are highly desirable and that the conception which you share with the Canadian Medical Association is feasible—a conception of "a system of health insurance which will be more all-inclusive, efficient and sound than any which has ever been devised and operated anywhere. It should place much emphasis on the prevention of disease and the development of a high degree of physical fitness, and should also include complete modern diagnostic and curative services. Possibly this full program cannot be immediately instituted in its entirety . . . but the full service should be visualized and planned for. Medical knowledge in the prevention and cure of disease is far ahead of the means for its general utilization by the public." We agree too that "the benefits of health insurance must be made available to everyone"; but the road of the journey to that happy land will not be easy—much hard work lies ahead.

It is easy to say that medical care must be made available to everyone in the community. But as the vision unfolds of complete medical, surgical and dental care, of adequate hospitalization, of adequate supply of drugs and appliances for everyone, regardless of residence, age or income, the difficulties seem insurmountable. Difficulties are but a challenge to resourceful men. They are not reasons why we should not plan, nor why we should not plant our feet firmly on the road to achievement and fix our sights upon the vision you have outlined for us. While we plan the superstructure, much can and should be done, at once, to build firm foundations.

The life companies have stated their position clearly. They have pledged their hearty support to the inauguration and integration of well co-ordinated and practicable plans:

(a) To provide a system of medical service directed towards the achievement of positive health, of the prevention of disease and the relief of sickness and

(b) To render available to every individual all necessary medical services, both general and specialist.

For the sake of record, I give the actual words of the submission of the life insurance companies:

"(a) With the inauguration and integration of well prepared and practicable social security plans for the maintenance of a minimum subsistence level for all classes, the life insurance industry is much in sympathy and will give its hearty support.

"(b) With the inauguration of comprehensive and efficient health and rehabilitation services, we, as life insurance organizations, are also heartily in accord.

"(c) Thus we visualize the consolidation of existing health and rehabilitation schemes. We support well co-ordinated and integrated plans to these ends."

Further we filed a separate memorandum emphasizing the pre-eminent importance we attach to developments in the field of public health and the necessity for the elimination of the causes of sickness and disease. It is futile to arrange medical treatment for the individual to cure his disability and to return him to productive employment merely to have him become ill again.

In addition, we urged that in our opinion public health measures should be co-ordinated with, but not consolidated with, a health insurance plan. It is our view that preventive and curative aspects of the whole question should be dealt with as distinct problems administratively. We recognize that the two aspects are complementary, nevertheless "we believe that public health services essential for the public welfare should stand on their own" and that the Dominion might encourage the provinces to adopt or enlarge public health programs but that such programs should be independent of any action taken by the provinces with respect to the inauguration of a plan of health insurance. We believe that "while every effort should be made to co-ordinate such program with any health insurance plan that may be adopted, the satisfactory operation of each would only be hampered by their formal union." We disagreed with the recommendation of the Advisory Committee on Health Insurance that "the Dominion will assist the provinces both with respect to health insurance and with respect to a public health program, but will not help a province with regard to either one of these projects unless both are put into effect."

Mr. Chairman, this statement of the life companies' point of view has led me somewhat away from my theme. I said earlier the objectives of our joint conception of public health measures and health insurance are highly desirable. We believe they are feasible. Having stated this, proposals officially put forward should be examined with critical sympathy, with a view to determine whether they will accomplish their purpose with reasonable efficiency; whether they are within our capacity at the present stage of our economic and political development, and whether the steps taken to build the whole structure are correct in their order and timing. But before this is completed, I cannot emphasize too strongly how important it is, as a condition precedent, that careful study and consideration be first given to see that the foundations of the superstructure are firm and sound.

I therefore do not intend to discuss today the technical features of the superstructure suggested by the Advisory Committee on Health Insurance,

from any point of view—medical, actuarial or financial. Rather do I invite your consideration of the firm foundations to support any superstructure which may be envisaged, which must first be undertaken in Canada, if we are to do an efficient job.

Two of the most fundamental steps which I believe must come first in any national plan of social security and health insurance are: firstly, an adequate supply of food with proper nutrition, and secondly, proper shelter, including in that broad term, adequate housing, fuel and clothing. It was a matter of some surprise to me that your submission which was so excellent in every way did not place greater emphasis on these two points.

The primary material necessities of life are—food, shelter and a job, and, as Sir John Boyd Orr* points out in his recent book, "Fighting for What," "if we are planning for human welfare we must put first things first, and concentrate on food, houses and a job." May I commend his book to your attention. His theories are developed in detail and will prove interesting not only to the nutritionist but to the economist by reason of the repercussions upon agriculture and the whole economy of the nation because of the economic changes that must ensue from the adoption of sound nutritional habits.

The Canadian Medical Association and the life insurance companies in Canada put on the first *national* campaign of any country in the world, in the field of better nutrition, just six years ago, and since that day they have carried out several additional national campaigns. The need is still great and I would urge that this great association, with all its prestige, throw its powerful influence in taking positive steps towards remedying the little-realized conditions of malnutrition that exist in Canada today.

I do not need to enlarge on this point. Several articles have appeared in your own Journal, but much more needs to be done and can be done, before conditions will be remedied.

You will note Sir John's third step—the opportunity for a job. Sir William Beveridge also states quite clearly that upon the avoidance of mass unemployment, or upon full employment, as it is quite generally incorrectly termed, rests the feasibility of any satisfactory scheme of social insurance. This need not be enlarged upon today. The prime importance of this firm foundation is understood both by government and citizen alike.

These three problems—food, housing, and a job—are of course world-wide and not peculiar to Canada alone. However, in Canada other problems and dangers face us which are peculiar to ourselves. Indeed, these obstacles on our road must be removed before we can proceed very far towards the goal and the vision we have set ourselves.

The first and most immediate danger is the possibility of a runaway inflation. This cannot be discussed in great detail at this time; the subject is too vast. The possibilities of extensive inflation are greater in this war than in the last. Even today we have not yet recovered from the ill effects of inflation in the last war. The Government in this war is deserving of great credit for

*See page xi, "Fighting for What", Sir John Boyd Orr, Macmillan, 1942.

its achievements to date in controlling inflation. Its fiscal policy has been brilliant in conception, sound in principle, thoroughly co-ordinated in procedure, and well-nigh perfect as to timing. Every citizen should give his aggressive, positive support to this effort, by paying his taxes cheerfully and promptly, by buying victory bonds to the utmost, and most important of all, by curtailing his demands for civilian goods and services to the limit. Should the dam break and a run-away inflation ensue, then I think it can be said, without any question of doubt, there will be no immediate prospect of health insurance in Canada.

The most pressing and the most important problem facing us for solution, not today perhaps, but certainly in the immediate future, is reallocation of the responsibilities of the Dominion, the provinces and the municipalities and their taxing powers. I submit that the solution must be found during the immediate years of peace, if we are to carry through not only health insurance, but many other plans of post-war reconstruction.

The economic and political development of Canada within the pattern laid down by the Fathers of Confederation has developed rigidities and maladjustments as time has gone on. They became quite clearly evident in the years following the last war, but the subsequent prosperity served to cloak them for a time. It took the stress and strain of the great depression to uncover them in all their nakedness. These problems have been set out in great detail but with conciseness and clarity in the wise and able report of the Rowell-Sirois Commission. It is not necessary to agree with the recommendations of that distinguished Commission as to the solution of our national difficulties. Other solutions may be equally satisfactory. The point I am making is this: the problems cannot be shelved with safety, if we hope to build a stable and prosperous Canada, a Canada with a high purpose and noble vision. We cannot have sound public health measures, successful health insurance schemes or any of the much-to-be-desired social security plans so long as we have the present rigidities and maladjustments. For instance, what is the sense of eliminating slums, the hot-beds of disease, if our economic procedures and methods of taxation continue to produce them? What good purpose is served by setting up a national plan of public health and health insurance if a province says publicly and submits the proof that its share of this plan is beyond its capacity? We cannot have that better post-war world so long as we strive to operate within a conception of government and a division of responsibility determined at a time when we knew not the telephone, the airplane, the radio, the motor, the internal combustion engine, and all the discoveries of chemistry, medicine and social welfare. I regard it as an essential condition precedent to the adoption of successful social security measures in Canada that there be a re-allocation of the responsibilities of Governments—Dominion, provincial, and municipal, and their taxing powers.

If you doubt so emphatic a statement, I would ask you to read the evidence before the Parliamentary Committee on Reconstruction and Re-establishment by the Hon. Stuart Garson, Premier of Manitoba, in June of this year. Mr. Garson has stated the position clearly, but very briefly in these words:

"The Canadian Constitution has determined what the provincial share in post-war reconstruction shall be. The Canadian Constitution has determined what the provincial financial resources after the war will be. As far as we in Manitoba can judge, provincial post-war financial resources so determined will not support the provincial share of the post-war program so determined. If we are sincere in our desire for a post-war program we must either increase the provinces' financial resources by federal adjustment grants or we must transfer from the provinces to the Dominion a large part of what is now the provinces' constitutional responsibility for the post-war program. If we do not do either or some of both of these things we will not have an adequate post-war program in Canada."

Mr. Garson presented, with the actual figures, Manitoba's estimated costs of implementing the three proposals already made, health insurance, social security, and education. This was made on the assumption that Manitoba will obtain her full share of the national income, that it would be maintained at a level twice that existing at the outbreak of war, and that Manitoba would continue to impose the very heavy taxation that has been probably higher than that of any other province, and that Manitoba's revenue would continue to be as it is today—approximately twenty million dollars. Mr. Garson estimated that under the three proposals now made as to health insurance, social security and education, on the assumption that the Dominion would pay one-third the cost of health insurance instead of the one-sixth now proposed, the increase in expenditure would be more than fifteen million dollars. Accordingly the amount to be spent on these three projects alone would be more than the entire revenues of the province based upon the most optimistic prosperity and capacity to continue high level of taxation.

However, were Manitoba to undertake no additional responsibilities as to education and social security—a quite untenable assumption—but were to undertake merely health insurance on the basis now proposed, and assuming the estimates as to over-all cost and Dominion participation to be as estimated by the Advisory Committee, then the increase for this project alone would be about five million dollars. If this be added to Manitoba's expenditure for all purposes for the current year, Manitoba would require more than twenty-two million dollars revenue a year against an estimated post-war maximum revenue of twenty millions, on the assumptions I have just mentioned.

This means deficit financing, but though deficit financing has been considered, in some quarters, as feasible and desirable, no one has ever suggested it be extended to provincial or municipal governments having no control over the country's monetary system.

At any rate, Mr. Garson gives it as his opinion that deficit budgeting by provinces is impossible upon the basis of the present Dominion-Provincial relations and that Manitoba is unable to undertake any of these post-war responsibilities within the present division of responsibilities and taxing powers.

The health insurance proposals put forward by the Advisory Committee contemplate the possibility of nine separate funds with nine different schedules

of benefits and of contributions and of costs to the province concerned. The problem of providing full employment and the general problem of social security as a whole, as well as health insurance, is a national one and can only be solved by a national program. But, supposing the present plan does go through, and the provinces attempt to do their part, even though some provinces such as Manitoba say it is beyond their capacity, what then? Do you think the bitterness and the frustration that arose or the maladjustments that became so evident after the last war and during the depression will, under those circumstances, be any less after this war? How firm will be the foundations of any plan of social security that rests upon the bitter frustration of a province unable, in whole or part, to enjoy the social insurance benefits available to other provinces?

If it is impossible to obtain constitutional amendments which will re-allocate responsibilities and taxing powers, then we suggest other machinery which will have the effect of lessening the burden upon the provinces and increasing the financial responsibility of the Dominion. However, the suggestion which the life companies made in their brief may not be acceptable, and others should therefore be considered. Perhaps some arrangement might be made whereby the entire field would be divided among the Dominion, the provinces and their municipalities. Is it impossible, for instance, for the Dominion to assume responsibility for many of the preventive services, as well as giving substantial assistance to special services such as hospitalization of the mentally ill, the tuberculous and perhaps others, leaving the problem of furnishing medical services to the doctors in private practice, and to charitable organizations? Surely there must be some dividing line that would be satisfactory to both the provinces and the Dominion.

Further, there is the whole problem of cash benefits. It is not sufficient to provide medical care in kind, using the phrase in its widest sense. The Dominion must, I think, obtain the necessary authority to inaugurate and administer a sickness insurance fund providing cash benefits; just as it has become responsible for an unemployment insurance fund.

Mr. Chairman, there are many other points that should be discussed and debated, but there is one more that I wish to bring out into the open. The question is debatable and I fancy there is no solid consensus of medical or lay opinion on the subject. Before I state the question, I wish it to be remembered that the present proposals are for the provision of medical care in kind—not cash benefits, and that medical services in kind have *not* yet been provided anywhere on the scale embodied in the present proposals, nor been proved a success. The question is, Mr. Chairman, what will be the status of the medical profession, should the present proposals be enacted? Will all doctors become civil servants?

I do not believe either the profession or the average citizen has given sufficient attention to this aspect of the problem. That it is a serious question will not be open to doubt on the part of anyone reading the September issue of the *Bulletin* of the Academy of Medicine of Toronto. I think it must have come as a shock to doctors and laymen alike that the Ministry of Health in Britain

should have thought it advisable to put forward suggestions for the nationalization of the medical profession or at least that part of it engaged in general practice. The proposal, which was subsequently withdrawn in the face of opposition from the doctors, visualized that all practitioners newly qualified would enter the service at a salary of £400 a year, continuing for three years, after which the salary would be increased by yearly increments of £30 to the maximum of £1,200 a year. The doctor would eventually receive a pension. He could not engage in private practice. Those already engaged in private practice would have the option of entering the service or continuing as they were. This is not the whole story, nor the most unattractive part of it. If you have not examined the complete proposal, I suggest you give it your attention.

That such a proposal could have been seriously put forward by the British Government shows the need for serious consideration of this problem. Were it to come about that doctors would be forced into such a strait jacket, I am quite sure the brilliant and enterprising minds would tend to seek other channels of service to mankind and that, in due course, the medical profession would be frozen at the current levels of development. The same remarks apply to the dentist, the nurse and others, because if the doctor is nationalized, so will they be.

I wish to make one further reference to a comment in your brief,—that to provide for adequate health department services alone, for the whole of Canada, other than self-contained cities and metropolitan districts, would require 400 doctors, 1,500 nurses, and 500 sanitary inspectors, together with office assistants and other technical staff. Thus, for this reason alone, it is not impossible, and will be until after the war, to provide sufficient staff to administer even this limited part of the public health services and the furnishing of medical care.

We therefore have a breathing space in which to plan and to organize.

In that planning and organizing the provision for medical care should be made to fit into the national economy. The knowledge and the talents of many professions will be required, if there is to be a well co-ordinated and well integrated plan. We have several measures of a social security nature now—mothers' allowances, old age pensions, unemployment insurance, and several others, each one set up independently of the others, full of anomalies and discrepancies which such methods of planning and timing produce.

It is to be hoped that when our present planning materializes into action, we shall have a streamlined plan, which will have the open and hearty support of the economic and financial advisers of the Government, of their legal advisers, the statisticians, the doctor, the nurse, the dentist, the druggist and many others, including the public health expert and the actuary.

If there is co-ordination of all professions interested in the development of the national economy, then we shall realize the hope that it will be possible to do in Canada what has not yet been successfully achieved in any country, i.e. a comprehensive system of medical service directed towards the achievement of positive health, of the prevention of disease and the relief of sickness.

Mr. Chairman, to recapitulate, these are some of the firm foundations which must be laid for such a system if we are to win the peace as well as the war:

1. Adequate and proper nutrition.
2. Shelter—good housing, fuel, clothing.
3. An opportunity for a job for everyone.
4. Avoidance of inflation.
5. Reallocation of responsibilities and taxing powers of governments—Dominion, provincial, and municipal.
6. The continued development of the skill, knowledge and enterprise of the medical, dental, and ancillary professions.
7. Co-ordination of social security plans through the collaboration of many professions.

These are not all the points that require careful study and debate. Fortunately for us, time for planning is still available. Health insurance which provides for medical care in kind is the most difficult of all the social security projects. The very nature of its unsolved problems counsels caution and the careful timing of each step. Inability to meet promised benefits, whether due to lack of a sound financial and economic policy or to the adoption of an unsound one, would surely lead to widespread disappointment. There is no greater danger to a democracy than a disillusioned people.

Influenza Amongst Immunized and Unimmunized Populations in 1943

RONALD HARE, DOROTHY M. STAMATIS, AND JOCELYN JACKSON
Connaught Laboratories, University of Toronto

WITH THE ASSISTANCE OF

C. E. DOLMAN, P. L. RENTIERS, P. W. HUDSON AND C. R. DONOVAN

AS described by Hare, Morgan, Jackson and Stamatis (1943), groups of persons had been immunized with concentrated influenza A vaccine in various centres across the Dominion of Canada from November, 1942 through January 1943. About an equal number had received injections of saline so that they could act as controls. These injections had been completed by the end of January 1943, during which month there had been no sign of an epidemic of upper respiratory tract infection. During the early part of February, cases of an influenzal nature began to appear in Toronto and in a military camp, Camp Borden, about 90 miles away. During the rest of the month and in March cases were observed in all the centres where immunization had been carried out. Arrangements had been made to study as many cases as possible not only to determine the value of the immunizations which had been carried out but also to acquire further information as to the aetiology of respiratory infection in general.

Immunization and Study of Infections

The vaccine consisted of a tenfold concentrate of influenza A virus which had been grown in the allantoic fluid of the developing egg. The details of its preparation were given by Hare, Morgan, Jackson and Stamatis (1943). Two doses of 1 cc. were given nine or ten days apart. An equal number of volunteers were given two doses of 1 cc. of saline to which had been added sufficient formalin to make the injection about as painful as those in which vaccine was injected. The volunteers themselves were unaware that saline had been employed and were under the impression that two varieties of vaccine were being compared. Similarly, those who were giving the immunizations and who studied the infections were also unaware of the deception. By means of the lot numbers it was, however, possible to determine who had been immunized and who had not. The numbers in each centre are given below.

	Immunized	Controls
Toronto—Medical students	68	60
Winnipeg—Members of the staff of the health department	74	85
Edmonton—Students of the University of Alberta	85	85
Vancouver—Students of the University of British Columbia	35	29

In addition to the above, 71 members of the staff of these Laboratories were also given vaccine, but the schemes of dosage employed were somewhat

different. Moreover, some of them received unconcentrated vaccine. For these reasons, this group must be judged separately. There were no controls in this group.

All those who received the injections were asked to report any form of upper respiratory tract infection during the subsequent three months, or until the end of March. It was very quickly found that unless extreme care be exercised, many cases do not report until it is too late. It is also necessary to be prepared to visit the patients in their homes.

The standards adopted in the various centres varied somewhat. In Toronto and Edmonton, every case of upper respiratory tract infection, no matter how trivial, was as far as possible studied. In Winnipeg and Vancouver, however, only cases of an influenzal nature were studied, those who merely had what appeared to be common colds being neglected.

CASES FROM UNIMMUNIZED POPULATIONS

In addition to the cases in the immunized and control groups detailed above, 102 cases admitted to Camp Borden Military Hospital during February were also studied by us. These have been described in the accompanying paper (Hare, Hamilton and Feasby), but reference is made to them here for the sake of completeness. Finally, a small group of 9 cases occurring in Toronto who were in neither the immunized nor the control groups were also studied.

STUDY OF THE CASES

The patients were for the most part treated at home although a high proportion were never ill enough to be away from work. Nevertheless, by means of a careful history taken at the first visit, the provision of simple forms which the patient was asked to fill in day by day, and cross-examination when the infection was over, it was possible to get some idea of the main symptoms of the infection. When the patient remained at home, a visit was paid in order to obtain the necessary specimens and make a diagnosis. Thermometers were provided when necessary so that the patients could take their own temperatures.

At the first visit, blood was withdrawn for titration. A second specimen was obtained one or two weeks after the infection had subsided. In the case of some patients, particularly those in Camp Borden Military Hospital, this second specimen was obtained the day the man left hospital, which with some patients was only about seven days after the start of the infection. This was found to be advisable because of the difficulty of tracing convalescents once they had returned to their units.

In Toronto, throat garglings were taken from every case. About 10 cc. of saline was gargled, to which 2 cc. of broth was then added and the whole frozen in a dry-ice refrigerator. No specimens of this type were taken in Winnipeg and Edmonton, but Dr. Dolman was good enough to take a number of washings from his cases in Vancouver. These were sent in vacuum flasks by air-mail to Toronto.

Bacteriological examination of a pharyngeal swab was carried out in all the Toronto cases. In other centres this was omitted although at Camp Borden an examination of the sputum was carried out.

PROGRESS OF THE EPIDEMIC

As already mentioned, cases were first seen in Toronto and Camp Borden, about 90 miles away, at the end of January. Chart I shows the progress of the epidemic according to the number of cases reported amongst the immunized and control groups in all the centres. The peak of the epidemic in Toronto and Camp Borden was clearly in the week of February 13th to 20th. In Winnipeg the number of cases investigated was small but the peak was apparently in the week of February 20th to 27th. The number of cases in Vancouver was also small but there were four cases in the week of February 28th to March 6th. Edmonton was evidently attacked later, for the peak came in the week of March 14th to 20th, when there were 10 cases. No

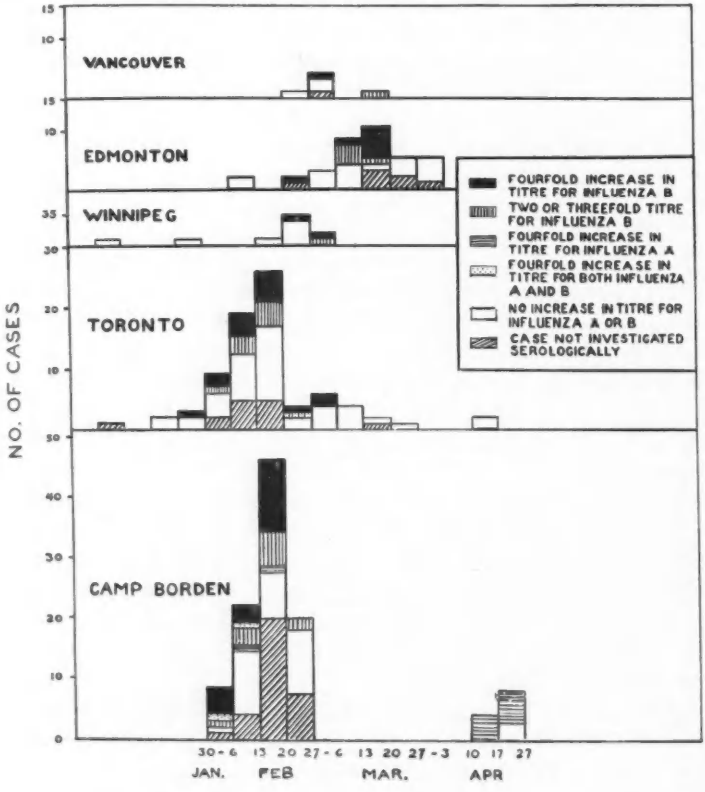
VANCOUVER
EDMONTON
WINNIPEG
TORONTO
CAMP BORDEN
NO. OF CASES
FOURFOLD INCREASE IN TITRE FOR INFLUENZA B
TWO OR THREEFOLD TITRE FOR INFLUENZA B
FOURFOLD INCREASE IN TITRE FOR INFLUENZA A
FOURFOLD INCREASE IN TITRE FOR BOTH INFLUENZA A AND B
NO INCREASE IN TITRE FOR INFLUENZA A OR B
CASE NOT INVESTIGATED SEROLOGICALLY
30-6 13 20 27-6 13 20 27-3 10 17 27
JAN. FEB MAR. APR

CHART I

Incidence of upper respiratory tract infection in each centre during the months of February, March and April, with the serological diagnosis of each case.

immunizations were carried out in Quebec or the Maritime Provinces nor were observations made on cases in that area. It is therefore not possible to say whether the epidemic travelled from the east to Toronto and thence westward or whether it originated in Ontario.

INCIDENCE OF INFECTION

The incidence of infection in both immunized and control groups is given in table I. The serological results are given in table III, from which it will be seen that none of the patients were infected with influenza A. No information as to the value of the vaccine has therefore been obtained. There were, however, more infections in the immunized than in the control groups. No explanation for this can be advanced.

TABLE I

THE INCIDENCE OF INFECTION IN THE IMMUNIZED AND CONTROL GROUPS DURING JANUARY, FEBRUARY, MARCH AND APRIL, 1943

Place	Immunized with two doses of concentrated vaccine		Not immunized	
	Number	Number Infected	Number	Number Infected
Toronto	68	30	60	14
Edmonton	85	23	85	12
Winnipeg	74	5	85	6
Vancouver	35	4	29	2
TOTALS	262	62	259	34

CLINICAL SIGNS AND SYMPTOMS

In Toronto and Edmonton, every case of upper respiratory tract infection which presented itself was studied. A number of patients did not report during convalescence, so that a second blood was not taken and a serological diagnosis could not be made. The clinical condition of these patients is, however, known. In Winnipeg and Vancouver no attempt was made to study all the cases, only those with a probable diagnosis of influenza being followed.

The incidence of the principal signs and symptoms in both febrile and afebrile patients is given in table II. Any patient with a temperature of 99.4° and over was counted as febrile. It will be observed that a very high proportion of the patients had nasal symptoms. These were for the most part of an acute coryza-like nature, frequently with very profuse secretion. The remaining symptoms hardly require detailed comment except to point out that the incidence of the local symptoms in both febrile and afebrile groups was about equal. Headache and backache, signs more diagnostic of acute influenza, were definitely more common in the febrile group, however.

The onset was almost without exception slow and insidious.

Lung Involvement

No attempt was made to study this question owing to shortage of staff, but there can be little doubt that, judging from the symptoms, a proportion of the cases had primary atypical pneumonia, such as was seen in the cases studied at Camp Borden.

TABLE II

THE SIGNS AND SYMPTOMS OF THOSE INFECTED DURING THE EPIDEMIC IMMUNIZED AND CONTROL GROUPS TOGETHER

Centre	Number	Nasal symptoms, coryza	Sore throat	Cough	Head-ache	Back-ache, myalgia	Nausea, vomiting
		Febrile group					
Toronto							
Medicals	16	14	12	13	14	6	2
Connaught	12	9	10	8	11	10	2
Edmonton							
Students	19	18	15	18	16	16	4
Totals	47	41	37	39	41	32	8
Per cent		87.2	78.7	82.9	87.2	68.0	17.0
		Afebrile group					
Toronto							
Medicals	28	23	19	16	13	5	1
Connaught	21	12	12	9	7	10	5
Edmonton							
Students	16	13	13	13	5	3	1
Totals	65	48	44	38	25	18	7
Per cent		73.8	67.6	78.4	38.4	27.6	10.7

SEROLOGICAL INVESTIGATION

All sera were tested for their ability to inhibit the agglutination of chick red cells in the presence of allantoic fluid containing influenza A or B viruses. These estimations were carried out by the method described by Hirst (1942) as modified by Hare, Morgan, Jackson and Stamatis (1943). In order to economize serum, the first tube contained serum in a dilution of 1/16. An added reason for this practice is the fact that it is quite unusual for the titre to be below 1/16 when using this technique.

A fourfold increase in the titre of antibody for either virus was arbitrarily taken as evidence of infection. The results are given in table III in which the cases are divided into febrile and afebrile groups, immunized and controls. It will be observed that there was no definite evidence of infection with influenza A virus in any of the cases. On the other hand, a proportion of the cases was evidently infected with influenza B and it will be observed that a higher proportion of the cases in the febrile group showed evidence of infection with this virus than in the afebrile group.

Nevertheless, the proportion of those with influenza B in the febrile group was remarkably uniform in the different centres. This, considering the distance between them, is surprising. The incidence of influenza B in both immunized and control groups was approximately equal, there being a total of 16 cases in the immunized out of 77 fully investigated, giving an incidence of 20.7 per cent, while in the control group there were 10 cases in 36 or 27.7 per cent.

In table III it is seen that there was a relatively large number of patients with plus-minus rises in antibody for influenza B. This indicates that the titre increased only two or three times and not the four times arbitrarily adopted for diagnosis of influenza B infection. No less than 14.5 per cent of the patients showed this, whereas 23.6 per cent had the necessary fourfold

TABLE III

RESULTS OF TESTS ON PAIRS OF SERA FROM CASES OF UPPER RESPIRATORY TRACT INFECTION IN IMMUNIZED AND CONTROL GROUPS

Place	No.	Febrile cases						Afebrile cases					
		No.	No. not complete	Diagnostic rise in antibody for influenza				No.	No. not complete	Diagnostic rise in antibody for influenza			
				A		B				A		B	
				+	±	+	±			+	±	+	±
Toronto													
Connaught													
Immunized	27	8	0	0	0	2	1	19	0	0	0	3	3
Controls	9	7	3	0	0	3	0	2	0	0	0	0	0
Students													
Immunized	30	11	2	0	0	2	0	19	4	0	1	1	4
Controls	14	5	3	0	0	2	0	9	2	0	0	3	1
Totals	80	31	8	0	0	9	1	49	6	0	1	7	8
Per cent						37.5	4.1					16.2	18.6
Winnipeg													
Immunized	5	5	0	0	0	2	1	0	0	0	0	0	0
Controls	6	5	0	0	0	1	0	1	0	0	0	0	0
Totals	11	10	0	0	0	3	1	1	0	0	0	0	0
Per cent						30.0	10.0						
Edmonton													
Immunized	23	13	2	0	0	5	2	10	3	0	0	0	3
Controls	12	6	1	0	0	0	0	6	1	0	0	1	0
Totals	35	19	3	0	0	5	2	16	4	0	0	1	3
Per cent						31.2	12.5					8.3	25
Vancouver													
Immunized	4	4	1	0	0	1	1	0	0	0	0	0	0
Controls	2	2	0	0	0	0	0	0	0	0	0	0	0
Totals	6	6	1	0	0	1	1	0	0	0	0	0	0
Per cent						20.0	20.0						
TOTALS	132	66	12	0	0	18	5	66	10	0	0	8	11
PER CENT						33.3	9.2					14.2	19.6

increase. A very similar occurrence was seen in the patients at Camp Borden during the same epidemic, where 17.9 per cent had a two- or threefold increase and 29.8 per cent a fourfold or greater. In view of the arbitrary standard adopted that only patients with a fourfold increase in titre be counted as infected, these patients with two- or threefold increases cannot be counted as infected with influenza B virus. But there were too many to neglect entirely.

It would naturally be assumed that some of these slight rises were due to errors in technique, but falls in titre were very seldom observed such as would be the case were technique at fault. Nevertheless, a number were re-investigated, paying particular attention to accuracy of dilution, and using separate pipettes for each dilution and a more extended system of dilutions (1/16, 1/24 1/32, 1/48 and so on). Somewhat to our surprise, almost identical results were obtained. It is hoped to investigate these cases more fully in a later paper.

Thus no less than 33.3 per cent of the febrile and 14.2 per cent of the

afebrile cases were evidently infected with influenza B virus. If to these be added the cases with doubtful rise in antibody, the proportions become 42.9 and 33.8 per cent respectively.

The aetiology of the remaining cases has not been determined.

As mentioned below, isolation of influenza B virus was not achieved in any case tested. The evidence that there was an infection with B virus therefore rests entirely on the serological results. This may be questioned.

There is, however, no doubt that the post-infection titres of most of those considered to be infections with B virus were quite high. In table IV compari-

TABLE IV

TITRES FOR INFLUENZA B VIRUS OF SERA OF NORMAL ADULTS DURING AN INTER-EPIDEMIC PERIOD, AND OF CONVALESCENTS FROM INFECTION

Titre	Number of persons with serum of titre	
	Sera taken during inter-epidemic period	Sera taken during convalescence of patients with a fourfold increase in titre for influenza B
16	2	
16	8	
32	27	
48	1	
64	25	5
128	6	8
192	1	3
256	1	17
384		1
512		9
768		2
1,024		3
TOTAL	71	48

son is made between the titres of 71 persons on the staff of these Laboratories who had blood taken before the immunization procedures began and who therefore form a fairly typical sample of the population during an inter-epidemic period, and the post-infection titres of all the cases described in this paper together with those from Camp Borden judged to be influenza B on the basis of serological tests. There is no doubt that there is a striking difference between the two series, the highest titre in the normals being 1/256 and the largest number having a titre of 1/64. The post-infection series was well above this level, the majority having a titre of 1/256. In table I the

TABLE V

AMPLITUDE OF THE RISE IN TITRE FOR INFLUENZA B VIRUS IN CASES CONSIDERED TO HAVE BEEN INFECTED WITH THAT VIRUS

4 times	18 cases
5 times	1 case
6 times	3 cases
8 times	13 cases
10 times	1 case
12 times	1 case
16 times	8 cases
32 times	2 cases
96 times	1 case
TOTAL	48 cases

amplitude of the rise in titre is given and it is evident that it was quite considerable, being eight times or more in over half the cases.

Thus whether or not influenza B virus was actually causing infection, there is no doubt that the antibody level for this virus did undergo considerable alterations during the infection. It is possible, of course, that some related virus was responsible which had a common antigen but which does not infect ferrets, or that it was influenza B virus but of so low virulence that not even subclinical infection of the ferret was produced.

ISOLATION OF VIRUS

Two ferrets were inoculated under ether anaesthesia with ground centrifuged nasopharyngeal washings. One ferret was killed at the end of five days in order to provide material for passage and the other was allowed to survive for fourteen to twenty-one days, when it was bled from the heart for titration of antibody. The clinical symptoms in the ferrets were not marked although varying degrees of rhinorrhoea were noted. The temperature charts were not suggestive of infection. The washings of 11 patients all with serological evidence of influenza B infection were tested in this way.

Titration of the sera against both influenza A and B viruses did not indicate that there had been any infection of the ferrets with either of these viruses. Similar results were obtained with army cases. It had, however, been observed that influenza B is much more capricious in its ability to survive in a dry-ice refrigerator than influenza A. It is possible, therefore, that this may be the explanation. No passages have as yet been carried out.

CORRELATION BETWEEN CLINICAL CONDITION AND SEROLOGICAL DIAGNOSIS

This information is given in table VI. It will be observed that there was, on the whole, very little difference in clinical condition between those cases diagnosed as influenza B and those of unknown aetiology. This certainly applies to those who were febrile. In the afebrile group, there was actually less sore throat and cough in the influenza B patients than in the remainder, but the incidence of nasal symptoms was about the same. Headache and backache were markedly less frequent in the afebrile group than in the febrile, but the incidence in the influenza B cases was much the same as in the remainder. But perhaps the most important observation is the fact that the incidence of nasal symptoms in the febrile and afebrile groups, and in those due to influenza B as well as in those of unknown aetiology, was much the same. These symptoms were highly variable, ranging in severity from a transitory rawness and congestion of the nasal mucous membrane to a streaming cold with profuse lachrymation. The majority could only have been diagnosed as a common cold although the diagnosis of febrile catarrh might have been more justifiable in those who were febrile. At the other end of the scale were patients with practically no nasal symptoms, but headache, backache, and photophobia; some of them were febrile and some afebrile.

In the cases studied in this paper, primary atypical pneumonia was not specifically looked for but in the cases at Camp Borden, described in an accompanying paper, this complication appeared in 22.3 per cent of the febrile

TABLE VI

CORRELATION BETWEEN THE SIGNS AND SYMPTOMS AND THE SEROLOGICAL DIAGNOSIS
(Omitting all not tested serologically)

Place	Serological diagnosis	Number	Nasal symptoms, coryza	Sore throat	Cough	Head-ache	Back-ache, myalgia	Nausea, vomiting
			Febrile group					
Toronto								
Medicals	Influenza B	4	3	1	4	4	1	0
Connaught	Influenza B	5	5	3	5	5	5	0
Edmonton								
Students	Influenza B	5	4	5	5	3	4	2
Totals		14	12	9	14	12	10	2
Per cent			85.7	64.2	100	85.7	71.4	
Toronto								
Medicals	Not A or B	7	6	7	5	6	4	1
Connaught	Not A or B	7	4	7	3	6	5	2
Edmonton								
Students	Not A or B	11	11	7	10	10	9	2
Totals		25	21	21	18	22	18	5
Per cent			84.0	84.0	72.0	88.0	72.0	
			Afebrile group					
Toronto								
Medicals	Influenza B	4	4	1	2	3	1	1
Connaught	Influenza B	3	2	1	1	0	3	1
Edmonton								
Students	Influenza B	1	1	1	0	0	0	0
Totals		8	7	3	3	3	4	2
Per cent			85	37.5	37.5	37.5	50.0	25
Toronto								
Medicals	Not A or B	18	15	13	11	7	2	0
Connaught	Not A or B	18	10	11	8	7	7	4
Edmonton								
Students	Not A or B	11	9	10	10	5	3	1
Totals		47	34	34	29	19	12	5
Per cent			72.3	72.3	61.7	40.4	25.5	

cases. Some of them were presumably due to influenza B because of their serological reactions but the remainder were of unknown aetiology. There can be little doubt from the symptoms that a proportion of the civilian cases had this complication. There is thus evidence that the clinical picture varied from a simple afebrile cold to a relatively severe influenza complicated by primary atypical pneumonia, and that the same varied picture was seen both in cases with serological evidence of influenza B infection and those of unknown aetiology. It is of interest in this connection that Nigg, Eklund, Wilson and Crowley (1942) found that 29 per cent of their cases of influenza B had common cold and that many cases had scattered rales in the chest, probably indicative of primary atypical pneumonia. In two influenza A epidemics, on the other hand, the same workers did not observe any common colds, or rales in the chest.

DISCUSSION

The studies reported in this paper were originally started in the hope of determining whether human beings immunized against influenza A were protected against infection with that virus. In view of the almost complete absence of influenza A in any of the centres where such immunization had been carried out, this question must remain unanswered. An epidemic of rather a mild character and somewhat atypical in symptomatology did make its appearance in which about 23 per cent of the cases were due to influenza B.

In view of the fact that influenza B virus was not actually isolated, nor its presence in the ferret detected by the serological method, the diagnosis necessarily rests entirely on the serological tests with the sera from the patients. And it may be questioned whether a fourfold increase in the titre for influenza B in the agglutinin inhibition test justifies the assumption that infection with this virus had occurred. In the case of influenza A infection, this would be justified from the data presented by Hare, Morgan, Jackson and Stamatis (1943). But no such series of estimations appears to have been carried out with influenza B infections. There is, however, no doubt that in more than half the cases diagnosed as influenza B, the increase in titre was frequently much greater than fourfold and that the titres of the convalescent sera were far above the general level of a population bled during an inter-epidemic period. Until more information is available, the assumption would, therefore, appear to be justified.

There still remain for discussion the quite large number of cases who had a two- or threefold increase in the titre of antibody for influenza B and also those who had no detectable increase. It is possible that the former were in fact infected with influenza B but that the standard adopted was too severe. The results of Eaton and Martin (1942) corroborate this suggestion. But even if these be included, we still have over half the cases for whom no aetiological agent can even be suggested. It is possible that these patients, too, may have been infected by influenza B but for some reason failed to respond serologically; or, alternatively, that they had been infected by another virus altogether. This question will be debated more fully in a later paper.

One further point is of interest. There was a remarkable degree of similarity in the proportion of the cases in the different centres which were apparently infected with influenza B. Confining ourselves to the febrile cases and those showing a fourfold increase in titre for influenza B, 20 per cent of the cases in Vancouver, 31.2 per cent in Edmonton, 30 per cent in Winnipeg, 37.5 per cent in Toronto and 29.8 per cent in Camp Borden were evidently infected with this virus. No explanation can be put forward to account for this uniformity, but it is difficult to imagine how two infective agents could travel over two or three thousand miles of country and produce in successive centres about the same proportion of the total cases. An alternative explanation is that the populations were actually "seeded" with these infective agents long before the arrival of the appropriate stimulus which precipitated the outbreaks in each centre. This is a possibility in swine influenza, as pointed out by Shope (1943). Whether it is possible in human influenza has yet to be proved.

CONCLUSIONS

1. Outbreaks of an upper respiratory infection closely resembling influenza in various centres in the Dominion of Canada during February and March, 1943, are described.

2. There is serological evidence that about 23 per cent of the cases were due to infection by influenza B virus.

3. No clinical differences between the cases diagnosed as influenza B and the remainder could be detected.

4. The clinical condition of both influenza B cases and the remainder varied from a simple common cold to severe influenza complicated by primary atypical pneumonia.

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Influenza and Similar Respiratory Infections in a Military Camp over a Period of Three Years

RONALD HARE, JOHN HAMILTON,*
AND W. R. FEASBY*
Connaught Laboratories, University of Toronto
and Camp Borden Military Hospital

IN November 1940, investigation of cases of upper respiratory tract infection occurring in the Army was initiated. Medical officers specially detailed for the purpose made the clinical and routine bacteriological observations while the isolation of virus and necessary serological tests were carried out at the Connaught Laboratories, University of Toronto. Since this scheme was started, a number of different outbreaks have been studied and it is the purpose of this paper to summarize this work. The outbreaks in question comprise a relatively severe epidemic of the winter of 1940-41, one mild epidemic in the autumn of 1941, and three separate epidemics during the winter of 1942-43.

These all occurred in Camp Borden, which is a large military establishment about 90 miles to the north of Toronto lying in a very isolated part of rural Ontario. There is, however, much contact with the outside world, particularly during week-ends. The personnel of the camp consists for the most part of troops in training, and there is a constant influx of recruits and transfers from other camps. Cases of illness amongst the troops are, as far as possible, treated in the regimental aid posts and only the more severe cases are admitted to hospital. During epidemic periods the number of admissions may rise to as many as 40 or 50 a day. Obviously, every case could not be investigated but as many as possible were studied, particularly during 1942 and 1943. It is, however, of some importance that only definitely febrile cases were studied, no attempt being made to obtain material from the afebrile cases or subclinical infections.

During the period December 1940 to May 1942 the cases were under the clinical charge of Major W. Hurst Brown, from June 1942 to January 1943, of one of the authors (J. H.), and from February to the present time, of another author (W. R. F.).

Methods of Investigation

It is unnecessary to detail the methods employed for the clinical study of the patients or the routine laboratory investigations. Suffice it to say that blood counts were made on all patients as well as routine Wassermann tests. For the isolation of virus, the patient either gargled about 10 cc. of saline or had a similar quantity instilled into the nose by means of a rubber tube. The washings were immediately frozen in ice and salt and kept frozen until they

*Major, R.C.A.M.C.

could be despatched to Toronto, where they were placed in a dry-ice refrigerator. Blood was taken from every case as soon as possible after admission and again during convalescence. Usually (in the majority of the patients) this second blood was taken the day the patient was discharged, since it was found to be very difficult to obtain second specimens once the patient had returned to his unit.

The titre of the neutralizing antibody of these sera was determined for influenza A and B viruses either by neutralization tests in mice or the inhibition of agglutination of red cells. In the case of the former the technique of Francis et al (1936), as modified by Hare et al (1942), was employed. In the latter the method of Hirst (1942), modified by Hare, Morgan, Jackson and Stamatis (1943), was used. A fourfold rise in titre of the convalescent serum as compared with that taken during the acute phase was considered evidence of infection in the methods of test.

Isolation of virus was attempted in ferrets, the technique used being varied somewhat according to circumstances. These are described in the text.

EPIDEMIC OF 1940-41

Cases of influenza first appeared towards the end of November 1940. They were very similar in character to those seen in the civilian population at the same time. This epidemic was very widespread, cases in England and in numerous centres in North America being reported. There were many cases in Toronto, the characteristics of the epidemic in that area having already been reported (Hare, Auger and McClelland, 1942).

Clinically, the infections were typically influenzal in character, there being sudden onset with fever and chills. Varying degrees of muscular pain, headache and photophobia were common. Local symptoms other than cough were unusual. Lung involvement was almost completely absent.

Washings and sera were obtained from 7 patients on December 5th and convalescent sera about three weeks later. The sera were tested for ability to neutralize influenza A and B viruses by the mouse technique. These showed that 5 out of the 7 had been infected with influenza A virus, the remaining 2 showing little or no evidence of an increase in antibody level. There was no indication of infection with influenza B virus. Attempts to isolate virus were successful in only two instances.

There seems little doubt that this epidemic was merely part of the widespread outbreak which occurred at the same time, and it differed in no important respect from the cases seen in other parts of the world.

EPIDEMICS OF 1941-42

First Wave

Many cases of upper respiratory tract infection appeared during October and November 1941. From many of the cases specimens were taken but the majority were destroyed by fire. Acute phase and convalescent sera were saved from 10 patients, however, and washings from 4. There were very few cases in the civilian population during this period.

Clinically the patients had fairly typical influenza, the onset being sudden with chills and fever and the chief symptoms being headache, backache, cough and sore throat. (See table I.) Rhinorrhoea and coryza-like symptoms were not encountered and definite lung involvement was observed in only 1 of the 10 patients, there being consolidation of one lobe. Fever lasted for one to five days except in the patient with pneumonia, who was febrile for eleven days. The incidence of the principal signs and symptoms is given in table I.

Examination of the sera for ability to inhibit the agglutination of influenza A and B viruses indicated that none of the patients was infected with influenza A or B.

TABLE I

SIGNS AND SYMPTOMS OF THE PATIENTS IN THE DIFFERENT EPIDEMICS

Number investigated	Percentage showing the following signs and symptoms:									
	Sudden onset	Insidious onset	Acute nasal symptoms	Sore throat	Cough	Pain in chest	Headache	Backache	Nausea and/or vomiting	Primary atypical Pneumonia
					Autumn 1941					
10	40	60	20	60	90	10	70	80	0	0
					Autumn 1942					
34	35	69	33	38	50	0	78	88	30	0
11	27	72	36	18	91	0	100	66	36	100
					February 1943					
30	58	42	44.4	80	90	25	64	25.7	16.0	0
14	35.7	64.3	63.5	78.5	85	43.7	88.5	7.1	7.1	100
					April 1943					
12	91.5	8.5	41.7	50	50	16.7	66.6	41.7	0	0

The unfiltered washings from 4 of the patients were instilled into the nostrils of ferrets under ether anaesthesia. There was no temperature response suggestive of infection and sera taken from the animals after three weeks failed to neutralize influenza A or B viruses.

Second Wave

There were many cases of an influenzal nature during the months of January, February, and March 1942 but there was no sign of a definite epidemic. For a variety of reasons these cases were not studied.

EPIDEMICS OF 1942-43

There were three well-marked waves separated by periods during which there was little or no influenza.

First Wave

Cases first appeared in October and were admitted at intervals until December. There were no cases of an influenzal nature amongst civilians during this period although there was the usual outbreak of colds. During the period in question, 45 cases were investigated although many others were admitted to hospital during the same period.

Clinically the infections were different in a number of respects from those of the preceding years. The onset, for instance, was almost always gradual, many having a history of coryza or cough for five to seven days before the onset of the more acute symptoms for which they were admitted. The second point of distinction is that in a relatively high proportion of the cases there was definite evidence of lung involvement, to which the diagnosis of primary atypical pneumonia was given. Of the 45 cases studied, no fewer than 11 exhibited this complication. This proportion may appear unduly high but it is probably correct, for although many other cases were admitted during the period but are not included in this survey, those selected for study were not chosen for any particular reason. As mentioned below, pneumonia usually developed after the admission of the patient to hospital, so that cases with this complication could not, even unconsciously, be selected.

The incidence of the principal signs and symptoms is given in table I. The cases are divided into those with and those without primary atypical pneumonia. It will be observed that, on the whole, the symptoms were the same in both groups, the principal differences being in the higher incidence of cough and the lower incidence of sore throat in the pneumonia patients. As already mentioned, the onset and general symptoms of the cases with pneumonia were identical with those of the uncomplicated cases, the chest being quite clear on admission in all but 3 of the patients. The average time after the onset of symptoms for the appearance of signs suggestive of pneumonia was six days and three days after admission to hospital. There was little or no sputum in the early stages, although in a few patients it became moderately profuse, thick and greenish-yellow in colour some time after the development of signs in the chest. The range of temperature in both groups was the same, varying from 99°F. to 104°F. but the temperature tended to be higher and the duration longer in the pneumonic group (2-14 days, average 7.5 days, as against 1-8 days, average 3.1 days).

The most characteristic finding in the group with primary atypical pneumonia was fine, moist rales, usually confined to the lower part of one or other of the lower lobes, patchy in distribution. These adventitious sounds were frequently widespread, but in spite of this there was little change in the percussion note, movement of the chest or breath sounds. In some patients these signs were preceded by a slight diminution in movement, with slight suppression of breath sounds, but these were inconstant and not to be depended upon.

The rales became much coarser and usually persisted for some time after the patient became afebrile. In some patients, the lesions continued to spread after the fall in temperature. Consolidation with bronchial breath sounds was seen in one patient only, who showed a spreading involvement of one lung.

X-ray pictures showed the presence of patchy, ill-defined infiltration in one or both lower lobes extending outwards from the hilus. Nevertheless these findings rarely corresponded to those found on physical examination.

Laboratory Investigation

In 26 uncomplicated cases there was an average white cell count of 9,700

(5,300 to 14,500) and in the pneumonic group a count of 10,770, there being usually no increase after the development of pneumonia.

Sputum examination never revealed the presence of any predominant organism even after the development of pneumonia. If pneumococci or beta haemolytic streptococci occurred, they were few in number and mixed with other organisms. In no instance was the culture suggestive of a bacterial infection of the lungs. This certainly applies to the early stages of the disease; and even after the sputum became more purulent, as occurred in two cases, there was a mixture of organisms with no one species predominating.

Serological examination by the agglutinin-inhibition method, using both influenza A and B viruses, showed that neither of these viruses were implicated, there being no rise in titre during the infection in any case.

There is little doubt that this outbreak was a form of influenza, as it caused little beyond fever, backache, headache and generalized malaise in a high proportion of the patients. It is true that its onset was more insidious than is usually the case with infections due to influenza A or the influenza of a pandemic year, but, as described below, an epidemic of influenza B has been encountered in which the onset was also frequently slow and insidious. It is also true that no aetiological agent could be implicated in the serological tests, but this is becoming increasingly common nowadays in outbreaks which resemble classical influenza even more closely than did this one.

The most interesting finding was the relatively high proportion of the cases who developed signs in the chest, no less than 24 per cent being in this category. This pulmonary involvement was not, as far as could be determined, of bacterial origin and resembled closely the pathological condition described by previous authors under a variety of names such as pneumonitis, virus pneumonia and atypical pneumonia of unknown aetiology. The last appears to be the term which is least objectionable and which will hereafter be used in this paper.

Second Wave

There were very few infections of an influenzal nature during the month of January 1943 but during the first week in February many cases were admitted. At the same time there was a mild epidemic in the civilian population, not only in Toronto but also in Winnipeg, Edmonton, and Vancouver. Cases from these centres were also studied in the Connaught Laboratories and are reported upon in an accompanying paper (Hare, Stamatis and Jackson). The epidemic died away relatively soon, few cases being seen in Ontario after the end of February. Acute phase and convalescent sera, as well as washings, were obtained from 102 patients, but because the interval between the two bleedings was only six days or less in 35 patients, the results obtained in the latter were not included. This leaves 67 patients with an adequate interval between the two bleedings.

In a number of respects the infection was atypical in character. The onset was seldom sudden, and marked local symptoms such as profuse rhinorrhoea, sore throat, and cough were frequently encountered. In 24 out of 102 patients there was primary atypical pneumonia.

The principal signs and symptoms of the patients are given in table I, in which the cases are divided into those with and those without primary atypical pneumonia.

Clinical Manifestations

About half the patients had symptoms for about twelve hours before admission to hospital; the remainder had symptoms of a common cold with rhinorrhoea, etc. for varying periods up to seven days before the onset of the more acute symptoms which brought them to hospital. The average duration of the infection before admission in all patients was one day. The duration of the illness itself varied, depending to a large extent on whether or not pneumonia developed. The group without this complication spent from four to fourteen days (average 8.1 days) in hospital, while those with pneumonia spent eight to thirty days in hospital (average 19.8 days).

As a rule, the patients were admitted with a high temperature which fell during the first twenty-four hours and reached normality within one day. The duration was therefore little more than twenty-four hours, much shorter than is usual in the more typical infections such as those caused by influenza A, where a three-day fever is the rule. Acute nasal symptoms suggestive of the common cold were encountered in about one half of the cases. In the remainder there was slight local soreness of the nose and throat but little secretion.

Involvement of the lungs was detected in 14 of the 67 cases selected for serological study, giving a rate of 20.8 per cent. If the cases not studied serologically be included, there were 20 out of 102, or 19.6 per cent. In 5 of the cases, signs of pneumonia were already present on admission but in the remainder they made their appearance later, the time of this occurrence varying from two to eight days after admission. These cases also varied in their history, 6 of them being admitted the same day they fell ill, the remainder having had some form of upper respiratory tract infection for three to twelve days before the onset of the more acute symptoms which necessitated admission to hospital. In general, the only abnormality at the time of admission was suppression of breath sounds at the bases. Within three or four days, a few moist rales could be heard. In some cases these disappeared quite quickly but in others there was extension of the parenchymal involvement which could also be traced in the X-ray pictures. But frank consolidation was never demonstrated. During resolution the rales became fewer in number and rhonchi might be heard during the productive stage.

At the time of admission to hospital, the signs and symptoms of both pneumonic and non-pneumonic cases were very much the same. And, as occurred in the first wave of this winter, it was not possible to detect which patients were going to develop pneumonia unless, of course, this complication was already present at the time of admission. There is little doubt that, on the whole, the involvement of the lungs in these cases was less severe and less extensive than in the series described by Meakins (1943).

Laboratory Investigations

Bacteriological examination of nasopharyngeal swabs was carried out in 20 of the cases studied serologically. Six of the cases had pneumonia and of these no fewer than 5 had group A haemolytic streptococci in the throat. The remaining 14 cases who did not have pneumonia comprised 9 with haemolytic streptococci of this group and 3 without. It should be mentioned that there was much streptococcal infection in the hospital at the time and it is more than probable that the patients acquired their organisms in the hospital.

Bacteriological examination of the sputum of all cases who were producing it was also carried out, and except for haemolytic streptococci in those patients who showed them on nasopharyngeal swabs and the higher types of pneumococci, the bacterial flora was indeterminate. It was not possible to correlate the presence of pneumonia and any particular bacterium in the sputum.

Sera from the 67 cases in which there was an interval of seven days between the bleedings were tested for their ability to inhibit the agglutination of chick red cells by both influenza A and B viruses. The results obtained are given in table II, from which it will be seen that 20 were probably infected by influenza B, 3 by influenza A, and 2 by both viruses. Except for 12 in which there was a doubtful rise in the level of antibody for influenza B, no aetiological agent could be detected in the remaining 30 patients.

TABLE II

RESULTS OF SEROLOGICAL EXAMINATION OF 67 PAIRS OF SERA FROM PATIENTS IN THE SECOND WAVE OF 1942-43

Diagnosis	Number	Fourfold increase in titre for:			Two or threefold increase for Influenza B	No increase for A or B
		Influenza A	Influenza B	Both A and B		
Influenza.....	53	1	17	1	8	26
Primary atypical Pneumonia...	14	1	3	1	4	5
TOTALS.....	67	2	20	2	12	31

In Toronto and Edmonton, every case amongst civilians was, as far as possible, investigated. A high proportion of them were febrile. The serological results obtained are given in table III, which is a condensation of part of table VI in the accompanying paper by Hare, Stamatis and Jackson. It will be seen that of those who were febrile, 9 (37.5 per cent) in Toronto and 5 (31.2 per cent) in Edmonton were evidently infected with influenza B. These figures are very close to the 29.8 per cent found in the cases at Camp Borden, all of which were febrile. It is thus obvious that this outbreak at Camp Borden was part of a widespread outbreak of upper respiratory infection extending right across the country. A further point which emerges is the occurrence of afebrile cases of influenza B in the civilian population, no less than 14 per cent of the afebrile cases showing the necessary serological change. Afebrile cases were not studied at Camp Borden but there is no doubt that they occurred in large numbers. Influenza B infection was therefore probably very widespread and by no means limited to those with fever.

TABLE III

RESULTS OF SEROLOGICAL EXAMINATION OF PAIRS OF SERA FROM CIVILIAN CASES IN DIFFERENT CENTRES IN FEBRUARY AND MARCH 1943 COMPARED WITH THOSE IN CAMP BORDEN

Place	Number	Clinical condition of the patients									
		Febrile					Afebrile				
		Number	Not complete	Fourfold rise in titre for:			Number	Not complete	Fourfold rise in titre for:		
				A	B	AB			A	B	AB
Toronto	79	29	5	0	9		50	6	0	7	0
Edmonton	35	19	3	0	5	0	16	4	0	1	
Camp Borden	67	67	0	3	20	2	0	0	0	0	0
TOTALS	181	115	8	3	34	2	66	10	0	8	0

Washings from 5 patients with evidence of influenza B infection were instilled into the noses of ferrets. Two were used for each patient, one animal being killed at the end of five days and the other being allowed to survive for fourteen to twenty-one days, when it was bled from the heart and a post-mortem carried out. The serum after inactivation was tested against both influenza A and B. No rise in antibody level was in any instance detected. Somewhat similar results were obtained in civilian cases; washings from 11 patients with serological evidence of influenza B were instilled into ferrets but no evidence of B infection in the ferret was detected. Thus in a total of 16 attempts not one successful isolation of virus was obtained. Passages have not up to the present been carried out. It is possible that influenza B virus is much less resistant than is influenza A and that it died out while the washings were held in the dry-ice refrigerator. We have certainly observed that this virus is not to be depended upon to survive for very long in allantoic fluid in the dry-ice refrigerator.

There seems little doubt that this was a widespread epidemic in which about 28 to 35 per cent of the febrile cases and about 14 per cent of the afebrile were probably infected with influenza B. Except for 4 cases which may have been due to influenza A, the aetiology of the remainder is doubtful.

TABLE IV

SUMMARY OF THE SEROLOGICAL RESULTS IN THE FIVE EPIDEMICS INVESTIGATED

Epidemic	Number	Fourfold increase in titre for:			Less than fourfold increase for Influenza A or B
		Influenza A	Influenza B	Both A and B	
1940-41					
December	7	5	0	0	0
1941					
Oct.-Nov.	10	0	0	0	10
1942					
Oct.-Dec.	45	0	0	0	45
1943					
February	67	3	20	2	42
April	12	9	0	0	3

It is, however, of some interest that if we confine ourselves to cases diagnosed on serological grounds as influenza B, the clinical condition ranged from what appeared to be a quite mild cold, through a series of infections of increasing severity: a severe afebrile cold with no temperature but profuse rhinorrhoea, a relatively mild attack of influenza with fever for a day or two, and a severe, highly febrile infection with extensive involvement of the lungs. The last was almost certainly not bacterial in origin. Precisely similar divergent clinical entities could be quoted from the group for which no aetiological agent could be demonstrated.

It was, moreover, not possible to show that there was any marked difference between the clinical signs and symptoms of those presumably due to influenza B and those of unknown aetiology.

Third Wave

There was an almost complete absence of influenza during the month of March, but about half way through April cases appeared again.

Twelve patients from Camp Borden were studied and also four patients in an isolated unit in the same area. So far as we have been able to ascertain, there were practically no cases amongst the civilian population of the surrounding country or in Toronto. The epidemic disappeared very quickly within fourteen days of its first appearance.

In over 90 per cent of the cases, the onset was sudden, with severe headache and general malaise. The local symptoms in the nasopharynx were less frequent and milder than those of the preceding wave. Sneezing and epistaxis were, however, commoner but the profuse rhinorrhoea seen in so many cases in that wave was not encountered. No cases developed symptoms or signs suggestive of pneumonia. Backache and myalgia were relatively commoner. The temperature charts usually showed a temperature of 99°F. on the first day, 102° or 103° on the second and 99° on the third day, falling to normal on the fourth. The general picture was, therefore, a very mild infection with practically no local symptoms.

All the patients were already in hospital for other conditions or were on the staff and were admitted very shortly after the onset. The stay in hospital for this infection varied from four to fourteen days, with an average of 5.7 days.

Serological examination of the twelve pairs of sera showed that 9 patients were evidently infected by influenza A virus. None of the four pairs of sera from patients in the nearby but isolated unit showed evidence of infection with either influenza A or B viruses.

It is, therefore, probable that this was an extremely circumscribed epidemic of influenza A which showed no tendency to spread.

DISCUSSION

The epidemics reported in this paper provide further evidence for the view that a number of different agents may cause an influenza-like syndrome. They also clarify somewhat the relationship of influenza to common colds on the one hand and to primary atypical pneumonia on the other. The incidence of

the principal signs and symptoms is summarized in table I and the serological results in table IV.

The first epidemic, that of 1940-41, was part of the widespread epidemic which occurred in both Europe and America in which a proportion of the cases were due to influenza A but with no identifiable agent responsible for the remainder. Nevertheless, from the experience of the cases at Camp Borden and those seen in civilians, it was quite impossible to distinguish between them on a clinical basis.

The epidemics in the succeeding year were not studied as completely as was desirable but there seems little doubt that the first wave, the only one studied, was not due to influenza A or B.

The year 1942-43 was by far the most interesting, for there were three separate and distinct waves, each apparently due to something different. The first was undoubtedly not due to influenza A or B and no aetiological agent has been identified. About one quarter of the cases had signs of lung involvement. This complication differed in no essential respect from the disease which has been reported as virus pneumonia, pneumonitis or, more preferably, primary atypical pneumonia of unknown origin.

The second wave in February 1943 was evidently part and parcel of a widespread epidemic which appeared at various centres across the Dominion in this and the succeeding month. The clinical signs and symptoms as seen in civilian cases are described in an accompanying paper and they differ in no essential respect from the military cases. It is of considerable interest that about 23 per cent of both military and civilian cases in all the centres studied were probably due to influenza B virus as judged by serological grounds. Actual isolation of influenza B was not achieved in any of the military or civilian cases in which it was attempted; and whether the diagnosis of influenza B on serological grounds is justified is debated in the accompanying paper. The aetiology of the remaining 77 per cent of the cases is doubtful. In this wave, too, about 26 per cent of the febrile cases (in the Army) had signs in the chest indicative of infection of the lungs and identical with the signs seen in the former wave. But it is of interest that this occurred more often in patients whose infection was not due to influenza B than in patients in whom it probably was.

The third wave occurred after a clear-cut interval of nearly two months and was evidently due to influenza A. But for some reason it remained confined to this particular camp and the civilian population remained uninfected. So far as we are aware, a highly circumscribed epidemic of influenza A infection in the midst of a camp crowded with men has not been described before. Infection with this virus was expected, as it was two years since the previous visitation and it is highly probable that many of the men were susceptible. There had been 4 cases in the hospital during February showing serological evidence of infection with this virus, and it is of considerable interest that the patients who were infected in this epidemic were nearly all either hospital personnel or patients already in hospital. It is just possible that they had acquired the virus at that time and the necessary stimulus appeared in April. A similar "salting" of a population with swine virus and the appearance of clinical infection some time later has been found to occur in swine influenza.

The first two waves of the 1942-43 season were perhaps the most instructive, for they throw some light on the connection between the common cold, influenza, and primary atypical pneumonia. The first of the two epidemics coincided with the usual outbreak of autumn colds and a high proportion of the cases certainly suffered from what appeared to be a common cold for a day or two until the more acute symptoms set in. There is reason to believe that there were many cases who did not have these severe symptoms and these patients were not admitted to hospital. The more acute symptoms which justified admission to hospital may not have been quite typical of influenza; but as there were backache, headache, and a short, sharp febrile illness with little else in the way of physical signs and symptoms, in about 76 per cent of the cases admitted to hospital, it would be quibbling to describe the disease as anything but influenza. The remaining 24 per cent had the same general signs and symptoms but in addition developed signs in the lungs sufficient to justify the diagnosis of primary atypical pneumonia.

There was obviously close relationship between the cases which developed this form of pneumonia and those which did not, because the onset, symptoms, and course for the first few days were similar in both groups. It is, therefore, reasonable to suggest that the same aetiological agent was responsible for the infection in both groups. That the pneumonia was not due to bacteria is highly probable but there is a possibility that it might be due to a second agent, probably a virus, complicating a relatively simple infection by another agent, also a virus. In view of the fact that neither of these possible viruses has as yet been demonstrated, such argument is premature but it should be borne in mind. There is, however, no reason why one agent should not cause, in one patient a relatively mild infection with practically no fever, in another patient a more severe infection with fever but no evidence of lung infection, and in yet a third a highly febrile infection with extensive involvement of the lungs.

Briefly, then, the hypothesis is advanced that all the symptoms from which the patients suffered (including the "common cold" from which many of them suffered for a few days before admission) were due to a single infection with an unknown aetiological agent and that the pulmonary involvement was not a complication but merely a further extension of the infective process down the respiratory tract.

A very similar syndrome was seen in the second wave with about the same proportion of the cases developing signs of lung involvement. There were many cases amongst the civilian population at the same time, and a high proportion of them were afebrile. These were studied by one of us, an opportunity for such study not being possible in Camp Borden. These afebrile cases suffered from what could only be diagnosed as ordinary common colds. A proportion of these civilian cases were febrile. In some the diagnosis of acute febrile catarrh would be justified; in others, a diagnosis of acute influenza. In cases at Camp Borden, all of whom were febrile, a similar diagnosis could be made but probably because they were under better clinical observation the presence of pneumonia in about 20 per cent was detected.

There is little doubt that the connection between the common colds, influenza, febrile catarrh and primary atypical pneumonia, which occurred in

both waves, was not merely accidental but pointed to a common aetiological agent in each wave. In the case of the first, this must still remain conjectural in the absence of any demonstrable aetiological agent. But in the second wave, a proportion of the cases was presumably infected with influenza B, some with A and two with both A and B, the remainder being also of unknown aetiology.

The question therefore arises whether all the cases were infected with the unknown agent but some had a complicating infection with A or B viruses, whether the three agents, influenza A, influenza B, and the unknown agent, were at work at the same time, each causing its own proportion of infections, or whether all the cases were due to influenza B, but some failed to respond serologically. With the available evidence it is not possible to answer these questions but it should be pointed out that the cases with evidence of infection by influenza A or B viruses in both Camp Borden and in the civilian population, tended on the whole to be more severe than those of unknown aetiology. Nevertheless, it would be perfectly easy to assemble two series of cases ranging from a simple afebrile common cold to primary atypical pneumonia, one series with evidence of infection with influenza B and the other of unknown aetiology. But until the aetiology of all or nearly all of the cases in epidemics of this type can be determined, it is hardly possible to proceed further. Nevertheless there was such close connection between the common colds, the influenzas and the pneumonias which occurred in both epidemics, and such close resemblance between cases for which a diagnosis could be provided and those for which it could not, as to point to some common aetiological agent in each wave. Beyond this it is hardly possible to go.

CONCLUSIONS

1. Two epidemics due to influenza A virus are described.
2. One epidemic of typical influenza is described for which no aetiological agent could be demonstrated.
3. Two epidemics are described in which the symptoms ranged from a simple common cold to a severe, highly febrile influenza complicated by primary atypical pneumonia.
4. In one of these epidemics, a sufficient number of cases was probably infected with influenza B virus to justify the assumption that this virus may cause infections ranging in severity from a mild common cold to primary atypical pneumonia.

The studies on which this paper is based have been assisted from time to time by many persons. We would particularly mention Col. Duncan Graham, Lt.-Col. W. Hurst Brown, and Capt. E. Roy of the R.C.A.M.C., and Dr. Wilfred Auger, Dr. Laurella McClelland, Miss Jocelyn Jackson and Miss Dorothy Stamatis of the Connaught Laboratories.

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The National Physical Fitness Act

J. J. HEAGERTY, B.A., M.D., D.P.H.
Director of Public Health Services
Department of Pensions and National Health
Ottawa, Ontario

FOR years, European countries, realizing the need for the physical development of youth, have conducted physical fitness activities which have as their object the physical, mental and moral development of youth. The activities include physical development in schools, colleges and universities through physical culture, the extension of playgrounds and the provision of opportunities for sports and the promotion of sport activities under national auspices. In addition to physical development, opportunities are given for education in dramatics, in music, in art and other cultural activities. Nutrition has been associated with physical examination and physical culture in the schools by the provision of free meals and other methods.

Great Britain became interested in the subject of physical fitness early and sent a delegation to European countries to study existing plans. The delegation included representatives of the Board of Education of England and Scotland and organizers and directors of physical training. It began its studies in November, 1936, and made a report which induced the British Government to supplement existing health and educational services of the country by promulgating an enactment for the improvement of the national physique. A memorandum explaining the Government's proposals for the development and extension of available facilities under the title of "Physical Training and Recreation" was presented by the President of the Board of Education and the Secretary of State for Scotland to Parliament by command of His Majesty in January, 1937. These proposals included the creation of National Advisory Councils for England, Scotland and Wales, to be composed of men and women selected because of their knowledge and experience of the work of physical education and sports. It was also proposed that grants committees be appointed for England, Scotland and Wales whose members would be responsible for receiving and examining applications for grants and for making grants subject to the approval of the responsible Minister. The proposals included the provision of regional and local committees. It was also proposed that there should be established a National College of Physical Training. The object was a two-fold one: firstly, to create in the public mind a realization of the value of physical fitness for its own sake; and, secondly, to provide facilities sufficiently attractive to make an effective appeal to the people of the country.

Meanwhile, at the twenty-fifth session of the League of Nations, the Health Committee when adopting its three-year plan of work considered that work in the field of physical fitness could be pursued successfully only by appointing a commission of physiologists to formulate scientific bases of rational physical

education adapted to different ages; but, before appointing the members of the proposed commission, the Health Committee considered it essential that a group of experts should be convened in order to obtain their views on the choice of subjects for study and the lines upon which the investigations should be conducted. The meeting of these experts was held in May, 1937, and their report communicated to a number of technical institutions and experts for their comments. The Health Committee took note of the report of the experts convened in May, 1937, and recommended that national committees on physical fitness should be constituted as had been done in the case of housing and nutrition and that an international committee be created comprising representatives of national committees. Following this, the Acting Canadian Advisory Officer at Geneva communicated with the Secretary of State for External Affairs of Canada reporting the activities of the Health Section of the League of Nations in respect of physical fitness, in the course of which he called attention to the Report of the Mixed Committee indicating that a disturbing situation existed in most countries regarding the physical fitness of large sections of the population. This applies to Canada as well. Later, a communication was addressed by the Director of the Health Section of the League to the Honourable Mr. Power, Minister of Pensions and National Health, indicating the desire of the Health Committee of the League that national fitness education committees should be set up in as many countries as possible and requesting to be advised if the establishment of a national committee might be contemplated in Canada and suggesting that a representative be named to the International Commission on Physical Fitness without delay as it was the intention of the Commission to convene during that year, namely, 1938.

The object of the National Physical Fitness Act is to promote the physical fitness of the people of Canada through the extension of physical education in schools, universities and other institutions including industrial establishments; to train teachers, lecturers and demonstrators; and to organize sports and athletics on a nation-wide scale. The objective includes the creation of a desire in persons of all ages for the well-being associated with physical fitness; to strengthen morale through a nation-wide program; and to enlist the support of organized physical-fitness agencies and that of individual volunteers. Physical fitness and health are closely related and associated with all those factors which make for good health. The program includes games, athletics and sports, rhythmics, swimming, aquatics and life-saving, outdoor activities such as camping and hiking, everyday activities and skills.

The idea of national physical fitness is fostered by all who are interested in the field of physical education and chiefly by men in the physical-fitness field who are associated with schools and universities and who urged the Dominion Government to establish a physical-fitness plan and provide funds to enable the provinces to establish a program along lines similar to those which have been in effect in Europe for a number of years.

A National Council on Physical Fitness will be established consisting of a director and nine other persons, each one of whom will represent one of the provinces of Canada participating in the National Physical Fitness Plan. The

only member of the Council to be paid a salary will be the director; other members will be paid travelling and maintenance expenses while in Ottawa. The national director will be selected from the provincial directors nominated by the various provinces. To enable such Council to function, there has been created a fund, known as "The National Physical Fitness Fund." It will be the duty of the Council to assist in the extension of physical education; to encourage and correlate all activities relating to physical education; to formulate plans for training teachers, lecturers and instructors; and to correlate efforts of the provinces to organize activities, to promote sports and to co-operate in the amelioration of physical defects amenable to improvement through physical exercise.

The Dominion will contribute the sum of $225,000.00 to the provinces and provide a sufficient amount to enable the National Council on Physical Fitness to carry out its activities—a total of $250,000.00.

It is proposed that the sum of $225,000.00 shall be distributed among the provinces in the following amounts:

Province	Population Census 1941	Percentage Distribution Population	Proportional Amount of Financial Grant
Prince Edward Island	95,047	0.827%	$ 1,861.00
Nova Scotia	577,962	5.030	11,317.75
New Brunswick	457,401	3.981	8,957.50
Quebec	3,331,882	28.999	65,248.00
Ontario	3,787,655	32.966	74,173.75
Manitoba	729,744	6.351	14,290.00
Saskatchewan	895,992	7.798	17,545.75
Alberta	796,169	6.929	15,590.50
British Columbia	817,861	7.118	16,015.75
CANADA[1]	11,489,713		$225,000.00[2]

[1]Exclusive of Yukon and Northwest Territories.
[2]Residue of $2.25 distributed evenly on the basis of 25c to each province. (Calculated by the Dominion Bureau of Statistics.)

In discussing the subject of national physical fitness before the Special Committee on Social Security, the Honourable Mr. Mackenzie had the following to say:

"In addition to health insurance, two other proposals which have been developed very largely in the Department of Pensions and National Health will be brought to the attention of this committee.

"One of them is the proposal for a national program of physical fitness for youth, which I shall now discuss.

"The other is a proposed reform in the method of dealing with pensions for the blind, about which I hope to have some information for you later on.

"The Advisory Committee on Health Insurance has recommended that a national health insurance scheme should provide for a series of ancillary grants to the provinces by way of financial assistance towards a half-dozen specified types of public health services.

"One, as has already been mentioned, is a physical fitness program especially for young people.

"Due to the fact that health insurance will require legislation by both the dominion and provincial parliaments, and the fact that the provincial legislation is exceedingly complex and will require a great deal of study, it is considered that all this proposed legislation could not be brought into operation within at least two years.

"The need, however, for a program of physical fitness has been brought home to us by the war, and it is one that could be organized quickly. For this reason, it has been thought that we might consider this particular subject aside altogether from the major health scheme and, perhaps, if the committee agrees, seek to move quickly.

"The proposal which has been developed in my department is for a national fitness fund and for a national council of physical fitness, consisting of a full-time director and nine members, one representing each province.

"A fund of approximately $250,000 is suggested, of which $25,000 would be required for the organization activities of the national council. The remainder would be available for grants to the provinces as a measure of assistance for an approved physical fitness program initiated and carried out under provincial auspices.

"The methods which can be pursued are almost infinite in their variety. Most of the European countries have highly organized schemes of physical education, of which one of the most outstanding is that which finds its expression in the great 'Sokols' in Czechoslovakia.

"Australia has had a federal fitness program for several years along the lines now proposed for adoption here. That is, there is a national fund of $500,000 out of which grants are made to the individual states. This was set up on a five-year basis.

"The United States has also launched a gigantic national fitness program partly as an aid to the war effort, but with full appreciation of its permanent long-range value.

"In Canada, physical education has in recent years come to be recognized as a part of the general education system, but, in spite of our national genius for sports and games, the numbers of our young people directly affected are astonishingly small. Sport, as we have it at present, seems to be aimed chiefly at the production of champions and record breakers.

"Sports organized under a physical fitness program would aim at the development of large numbers of young people able to perform creditably in the popular tests of athletic prowess. Instead of one youth who can run one hundred yards in ten seconds, we would like to see thousands who can run that distance in twelve seconds. Instead of a small number of marathon swimming champions, we would like to see every young person able to swim for fifteen consecutive minutes.

"An eminent authority in the United States, after commenting on the large number of young men who were rejected for military service, said that,

even of those accepted, only a small percentage could run half a mile at their own pace, jump over a waist-high fence, or chin themselves once.

"Physical fitness is more than a mere matter of health. It is, of course, closely related to health and contributes greatly towards health, but beyond that there is the objective of physical efficiency, of ability to use and co-ordinate the functions of the body effectively.

"British Columbia has for some years had a program of physical fitness under the direction of the provincial secretary's department, and known as 'Pro-Rec'. This program did a wonderful work among the unemployed youth in the depression period. Tens of thousands participated in organized recreational activities, including rhythmics, gymnastics, dancing and sports of all kinds. I have seen thousands engaged in a single demonstration in the public parks of Vancouver. The sight was comparable to that of the famous Czech 'Sokols'. Whether this European type of physical education is entirely suited to the genius of all our peoples may be questioned, but it certainly was a success in British Columbia.

"Particularly, however, we would like to encourage greater emphasis on physical education in the schools.

"Another valuable field for development is in connection with our great commercial and industrial establishments.

"The emphasis should, however, be laid upon giving the benefits of physical education to the greatest possible number.

"Having regard to the varying interests and tastes of different groups of people, the methods pursued can be of almost infinite variety. There are games, athletics and sports; rhythmics, gymnastics and exercises; swimming, aquatics and life-saving; camping, hiking and ski-ing—all manner of healthful, vigorous outdoor activities that make a strong, flexible and disciplined body.

"We must also not overlook the training of instructors, teachers and leaders, for without many of these we cannot hope to include large numbers of our young people.

"The value of physical fitness goes far beyond mere feats of strength and agility. Whether or not it was the Duke of Wellington who said that the Battle of Waterloo was won on the playing fields of Eton—somebody did, and, in doing so, formulated an epigram of profound significance. The Romans had a proverb about the relationship of a sound mind to a sound body. Mental and physical alertness are closely interdependent, and the time to lay the foundation for both is in youth.

"It is considered that each province will best be able to decide how to develop such a program among its own people whether by training instructors, providing premises, or subsidizing projects. The National Council, when it is satisfied that any given proposal will accomplish the desired end, may recommend to the government that an appropriation be made out of the National Fitness Fund."

It should be noted that the Act authorizes the payment to a province of monies as soon as a provincial organization for physical fitness has been established. Alberta has established such an organization. Other provinces have expressed a desire to do so.

An Experiment in Tuberculosis Control

J. V. RICHES, B.A., M.D., C.M.
The Geraldton Clinic, Geraldton, Ontario

IT is generally agreed among authorities of tuberculosis control and prevention that tuberculosis could be eliminated if every existing case could be discovered and hospitalized. It was on this principle that the small town of Geraldton, situated in the Little Long Lac gold-mining district of Ontario, tried an experiment that few other communities have undertaken. During a period of about three weeks in September and October, 1942, every person in this little town received an X-ray examination of the chest.

The Geraldton-Little Long Lac gold-mining district is situated in Ontario, approximately 190 miles north and east of the lakehead. The camp was the result of a gold "find" on the shores of Little Long Lac in 1932. This "find" was developed into Little Long Lac Gold Mines and became the original producer of the camp in 1934, followed by Bankfield Gold Mines, Hard Rock Gold Mines, MacLeod Cockshutt Gold Mines, Magnet Consolidated Mines and Tombill Gold Mines. The result of this expansion was the development of the town of Geraldton, which is built around the Canadian National Railways track about a mile and a half from the original find. The town at present has a population of 2,500, somewhat below its peak due to the war.

As it is isolated from the rest of civilization by 190 miles, the district lends itself admirably to a survey. The town is dependent entirely on the gold mines and it houses the majority of the miners and their families with the necessary adjuncts to a community—churches, schools, stores, etc. The hospital which serves the district is a growth from the original district hospital established on the Little Long Lac Gold Mines property by this company as a four-bed mine hospital in the summer of 1934. Now a fully modern thirty-five bed institution known as Little Long Lac Hospital, it was built for community service by the co-operation of all the local mining companies in 1939, at a cost to them of $60,000. Apart from a small grant by the town of Geraldton for the care of its indigent patients, and patients' fees, the hospital is financed by these mining companies. It is a "private" hospital in its incorporation, but public in every other sense. In other words, the mining companies own and finance the hospital.

In Ontario, under the Silicosis Division of the Workmen's Compensation Board, every miner employed in dust-exposure occupations—underground, crusher house, etc.—is required to undergo a physical examination, including X-ray of the chest, to determine whether he is physically fit for such exposure. Further X-ray examination is made yearly, or more often if necessary. In this camp, and I believe in all others in Ontario, through the co-operation of the Workmen's Compensation Board, all men employed in non-dust exposure occupations—mill, surface labour, etc.—are also checked by X-ray of the chest at the time of employment. In this way, exposure of miners to an open case

of tuberculosis is kept to a minimum. Any suspicious cases found on X-ray examination are investigated by the mine physicians.

Silicosis is a disease which follows irritation of the lungs in those exposed for prolonged periods to certain types of rock "dust", usually microscopic in size. Although scientific opinions differ as to the type and size of dust, the importance of a continual check of miners by periodic X-ray is appreciated. It is also agreed that those suffering from tuberculosis are more susceptible to silicosis and that those exposed to dust of certain types are more susceptible to tuberculosis. We also realize that tuberculosis is due to an infection by the tubercle bacillus. If therefore we can prevent our miners from coming in contact with those suffering from tuberculosis, this danger can be eradicated. Usually it takes years of exposure to "dust" to develop silicosis to a stage where it disables the workmen to a degree that they become compensable. Those miners with silicosis complicated by tuberculosis become disabled early and are a charge on the industry which employs them. The most important factor, however, is not the economic one, but rather the unnecessary suffering of individuals so disabled.

Consideration of tuberculosis in the everyday life of the community, as it causes personal suffering of the individual, prolonged hospitalization, and the loss of that individual from his or her productive position in society, prompted this survey. It is a well-recognized medical fact that early tuberculosis, in its easily curable state, can be discovered only by X-ray film. But if sanatorium care and expert medical attention are then provided, the individual can be returned to his or her useful place in society following treatment, not as a charge on society but as a productive unit of it. It had also been noted in the medical practice of the community that people with tuberculosis were usually advanced cases before they consulted their physicians. It was therefore felt that, if adequate control were to be exercised, the medical practitioners must seek out cases rather than wait for these advanced cases to come to them. We felt that this was our obligation to the community we serve. Though the incidence of tuberculosis in the district had not been high, we had encountered it more frequently before the war, when the population was greater.

The possible scope of such a survey was discussed and a decision was made that all adults in the district who were not employed in the mines should also be X-rayed. The mine employees had already been examined. Children at all the schools, both at the mines and in Geraldton, were to be tuberculin-tested and all positive reactors X-rayed. We did not feel, however, that once the original survey was completed the work should stop there. It was decided that all families of new employees should receive X-ray examinations, whether these new employees were at the mines or other places in Geraldton. All necessary medical or X-ray rechecks would be done, free of charge, at the local hospital. It was also decided to approach government agencies for financial and professional assistance. The plan was discussed with Dr. G. C. Brink, Director, Division of Tuberculosis Prevention, Department of Health of Ontario, and a request made for departmental assistance. The success of the survey owes much to Dr. Brink's enthusiasm and support. He arranged for a large supply of X-ray films and the use of one of the department's portable X-ray machines, with the services of Mr. McReynolds, their technician at Fort William. The bulk of the survey was to be done with the X-ray in Gerald-

ton. Members of outlying small communities, as at the individual mines, were to be examined at the local hospital. The mining companies agreed to share the cost of the survey on an employment basis and the council of the town of Geraldton agreed to give some financial support.

The active Geraldton Branch of the Canadian Red Cross Society, whose membership is representative of the community, was asked to sponsor the scheme. This the executive enthusiastically agreed to do and a small committee was appointed to arrange the details. Suitable quarters were donated by the MacLeod Cockshutt Athletic Association in the town. Through the co-operation of the local press, an attempt was made to acquaint the public with the reasons for the survey. Talks were given to various organizations on the importance of the survey, and appeals were made from the church pulpits. The numerous small organizations of various nationals in the district co-operated in every possible way. For instance, there are two local Ukrainian societies, with marked political differences; yet the two executives met together and arranged their plans in order to make the survey a success. This is but an isolated instance.

A few days previous to the survey, a house-to-house canvass was made by voluntary workers of the Red Cross. The town was divided into blocks and the canvassers worked in pairs, with the occasional help of an interpreter. Appointment sheets were used to record names and the time and place of examination. The individual was given a card with similar information. This canvass was completed in three days, with only five absolute refusals—a remarkable record in a community composed of such a large, mixed racial element. It also speaks most highly for the work of the ladies of the local Red Cross Society.

As a result, any delay or confusion was avoided at the time of the examination. The actual X-ray required only two and a half minutes of the person's time. The Red Cross Society arranged for clerical assistance and for a nurse to be present throughout the survey. Help was provided also for the technicians. Appointments were extremely well kept and the work proceeded very smoothly in spite of a severe snow storm. During the busiest day, 132 films were taken, and in the whole survey a total of 1,429. It was, of course, not necessary to examine every person. As was previously indicated, approximately 1,100 mine workers in the district are examined annually by the Workmen's Compensation Board. Of the 431 school children tuberculin-tested, 128 were found to be positive reactors and were X-rayed.

The X-ray films taken in Geraldton were shipped to Toronto and there processed, read and diagnosed by the specialist staff of the Tuberculosis Division of the Provincial Department of Health. Reports were returned to us at Geraldton. The films from outlying communities were processed and forwarded to the Tuberculosis Division for expert advice.

The findings indicate most emphatically the advantages of such a survey:

1.	Total number of individuals X-rayed		1,429
2.	Number with no disease	1,371—	95.9%
3.	Number with pulmonary tuberculosis	26—	1.8%
	Active cases for sanatorium	3	
	Arrested or healed disease	23	
		26	

4.	Suspect cases requiring re-examination	4—	.3%
5.	Number with non-tuberculosis conditions	28—	2.0%
		1,429—	100.0%

6. Previously unknown cases of tuberculosis—20 or 77% of all tuberculosis found in the survey.

Another important factor of the survey was that it revealed a great variety of other findings, ranging from possible cancerous growths to enlarged hearts, aortic aneurysms, etc.

On receipt of the reports from Toronto, the patient was immediately informed of the findings, and suggested investigations—temperature readings, sputum analysis, fluoroscopy and X-ray re-examination as indicated—were carried out. Provision was immediately made for the hospitalization of all those found to require sanatorium treatment, and newly discovered cases were added to the re-examination lists of the provincial clinics. Residents of the area away from home and unable to present themselves for examination at the time of the survey were later X-rayed at the local hospital. Thus all cases of tuberculosis within the boundaries of Geraldton were recorded, and provision made for them to safeguard the community and the individuals concerned.

It is hoped to maintain this record and every new family which moves to the district of Geraldton will be X-rayed. As time goes on, re-examination will reveal the significance of some of the conditions noted at the original examination, and it is only in the years to come that the actual value of this survey will be appreciated. Provided that the present emergency does not interfere too greatly with the operation of the local mines, some very enlightening facts about silicosis and tuberculosis may be revealed, particularly in relation to miners. The camp here is young, and our new miners have not yet been exposed to dust for a sufficient time to develop silicosis from exposure here. With the improvement of ventilating systems, we can hope that its development may be retarded; indeed, with the application of the present research for its prevention, I do not think it too optimistic to hope that it may never develop. As to tuberculosis alone, I can see no reason why such a survey could not be undertaken in any community. I believe that it is only in this manner that the disease can be controlled. In our experience, the response of the public was well worth the effort.

Since the completion of this survey, a further 123 films have been taken at the local hospital, including those of a number of local Indians in whom a very high percentage of tuberculosis was discovered. Nearly all of the Indian patients have been admitted to sanatorium for investigation and treatment. Among these we have discovered one patient with minimal tuberculosis who had been X-rayed at the time of the original survey. This patient is now under investigation and further care.

Geraldton's share of the cost of the survey, including transportation, advertising, etc., was $62.70. Altogether 1,552 films were taken at a cost of approximately 50 cents each, bringing the total cost to $788.70. In view of the tremendous value to the derived from such a survey, at an extremely small expenditure, I would urge every community interested in the control of tuberculosis to conduct one.

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INFLUENZA

IN the issues of August and this month appear three papers by a team of workers from the Connaught Laboratories, University of Toronto, assisted by physicians in other centres and medical officers attached to Camp Borden Military Hospital. The first paper, published in August, dealt with the serological response of volunteers to a concentrated vaccine made by a method developed in the Connaught Laboratories. There is evidence that the response is at least as good as that during a clinical infection.

This vaccine was made with influenza A virus, and volunteers were immunized in Toronto, Winnipeg, Edmonton, and Vancouver during the months of November and December 1942 and January 1943. An approximately equal number of controls were "immunized" with saline. It was expected that an epidemic of influenza A would make its appearance during the first quarter of 1943 because this variety seems to appear in two-year cycles, the last visitation being late in 1940. A mild epidemic duly made its appearance but its symptomatology was unlike that of influenza A and serological study of the cases showed that about 19 per cent of the cases were probably influenza B. These diagnoses are based on a serological method in which comparison is made between the serum taken during the acute phase of the infection and convalescent serum.

It is true that the actual isolation of the virus from each case should be the logical method of establishing a diagnosis, but the fact that isolation of a virus is at any time surrounded by its own peculiar perils and that influenza B is in this respect even more than usually troublesome, precludes this as a routine method of establishing the diagnosis. For this reason the practice has grown, in recent years, of making a diagnosis on the basis of an increase in the antibody level of the serum during the illness. If the titre increases four times or more, the infection is considered to have been due to the particular virus, influenza A or B, used for the tests. If the titre does not rise to this amount, the assumption is made that these viruses have not been implicated and the infection is considered to have been of unknown aetiology or, as some authors express it, "influenza Y".

While it is possible to accept a positive result by this method without very much hesitation, a negative result is subject to several interpretations. It is

possible, for instance, that an infection may have occurred but the rise in antibody level was smaller than the fourfold required; that the wrong type, although the right species, of virus was used for the tests; or simply that another aetiological agent was responsible. There has been a tendency to accept the last of these alternatives and to designate the cases "influenza Y".

Following this reasoning, all the recent epidemics have been "mixed". In 1938-39 and 1940-41, for instance, influenza A and "influenza Y" were the causative agents, and although the proportions varied somewhat in different centres, the majority of the cases were due to influenza A. Substantially the same thing occurred in 1943, influenza B and "influenza Y" being the responsible agents. But in this instance the majority of the cases were "influenza Y".

It must, however, be pointed out that these epidemics are extremely widespread. The epidemics of 1938-39 and 1940-41, for instance, extended over large areas of both Europe and North America. That of 1943 certainly infected large areas of North America, insufficient data being as yet available from Europe. And it is a striking fact that, in centre after centre, about the same proportion of the total cases were influenza A or B and "influenza Y". It is, however, extremely difficult to conceive an epidemic travelling thousands of miles in which two infective agents are involved without one or the other being left behind in the process. It is therefore a matter for serious consideration whether the cases returned as "influenza Y", or, more correctly, as of unknown aetiology, were not in reality infected by the same virus as that responsible for the cases which could be diagnosed.

The third paper, written in collaboration with two officers from Camp Borden Military Hospital, gives an account of the same epidemic as it appeared in that military establishment, and also details the results obtained in four other epidemics observed in the same camp during the period 1940-43. This emphasizes once again the protean nature of influenza, for of the five outbreaks two were due to influenza A, one to influenza B, and the remainder were of undetermined aetiology.

Spectacular as have been the advances of recent years in research in influenza, it cannot be said that, faced with a disaster such as that of 1918, we are yet in a position to do anything very dramatic in order to prevent its spread. The virus responsible for the next pandemic will almost certainly be one that is unrelated to those now isolated. For this reason it will be necessary first to isolate the virus. This in itself may be a difficult proceeding, for a susceptible animal will first have to be found. Even supposing this proved to be possible, the manufacture of vaccine in sufficient time for use in the epidemic is—by all present indications—a sheer impossibility. And vaccines compounded from known strains will almost certainly be useless.

WAR Brings Epidemics

Every Child Should Be Protected against

Diphtheria Smallpox
Whooping Cough

Consult Your Family Physician or Health Department

Contributed by THE HEALTH LEAGUE OF CANADA

National Immunization Week

NOVEMBER 14-21

THE value of an intensive educational effort for popularizing the use of diphtheria toxoid has been well shown by the work of the Diphtheria Committee of the Health League of Canada, particularly through "National Toxoid Week" in 1942, when facilities for immunization were made readily available. The local health departments were responsible for organizing and planning their activities during "Toxoid Week" and the Health League assisted with the essential publicity. Physicians also heartily co-operated in the effort. Encouraged by the results, the Health League, after consultation with the provincial health authorities, is undertaking a coast-to-coast program of education directed towards the prevention of smallpox and whooping cough as well as diphtheria. Concentration of these efforts to focus attention on the importance of the more widespread use of the preventive methods is planned for the week of November 14th, which will be designated "National Immunization Week". Copies of a four-colour poster, shown on the opposite page, are being made available for distribution in every school in Canada and copies for general distribution will be supplied at cost. An extensive series of radio addresses is being arranged and a motion picture film is in the course of preparation. The support of the press and the national magazines, as well as of health departments and physicians, is essential to the success of the plan. Among the national publications cooperating are: *Chatelaine, Canadian Home Journal, Liberty,* and the *Montreal Standard.*

In extending this part of its program, the Health League believes that the prevention of the communicable diseases for which there are specific preventive agents is of such significance to the health of our children and their future efficiency as citizens that the enlistment of all the machinery of education and propaganda in our country is justified.

CURRENT HEALTH LITERATURE

Sulfadiazine in Respiratory Tract Infections

DURING the winter of 1942-43 an experiment was undertaken at a United States army station hospital, to determine the value of sulfadiazine in respiratory tract infections with fever and malaise sufficient to warrant hospitalization. Two major groups were studied; 317 patients received sulfadiazine and a control group of 314 patients were given A.P.C. capsules. Symptomatic treatment otherwise was the same in the two groups. No significant difference was found between the two groups either in the length of the febrile period or in the period of hospitalization. The indiscriminate use of sulfonamides for the treatment of simple respiratory tract infections is regarded as highly unwarranted.

Howard A. Rusk and Arie C. van Ravensway, J.A.M.A., 1943, *122*: 495.

Sulfadiazine Prophylaxis in an Epidemic of Scarlet Fever

AN epidemic of scarlet fever at a United States naval station occurred in the fall of 1942 commencing in September and reaching a peak in November. The personnel, numbering several thousand during the time of the epidemic, was divided into two groups: students in a radio school, and transients. Cases were about equally divided between the two groups but were proportionately higher in the first. Bacteriological study showed that all cases were due to a single type of haemolytic streptococcus, group A, type 19. With new groups of radio students being admitted periodically, it appeared likely that the epidemic would continue and, further, it seemed possible that the transient group was receiving its infection from the radio students, both groups being lodged and messed together.

The entire personnel of the radio school was therefore placed on prophylactic doses of sulfadiazine 0.5 Gm. b.i.d. A striking reduction in the number of new cases occurred in the first week and continued thereafter. The incidence of scarlet fever in the transient group however remained high. Sulfadiazine prophylaxis was accordingly undertaken and the epidemic was brought to a complete halt. In addition, the number of men reporting to sick call with respiratory complaints decreased definitely during the period of prophylaxis while the number with non-respiratory complaints remained essentially unchanged.

No new cases had occurred following cessation of the drug up to a period of sixteen days in spite of a persisting high carrier rate. Toxic reactions during the period of observation were negligible.

Robert F. Watson and others, J.A.M.A., 1943, *122*: 730.

The Army's Contribution to Industrial Hygiene

WITH the introduction of mechanized warfare and the enrolment of large numbers of soldiers in "the armored forces" industrial hygiene has developed a new phase—military occupational hygiene. Certain health hazards formerly associated with various types of industry now confront the soldier. In addition, the present world range of military activities necessitates detailed studies of proper rations and proper clothing as well as the important matter of water consumption. The U.S. Army today employs not only soldiers but industrial workers; it owns and operates more than 160 industrial plants and owns others which are operated under contract. More than 600,000 men and women are employed.

In this article the author discusses various developments which have arisen out of this situation. At Fort Knox the Armored Force Medical Research Laboratory, staffed by scientific experts, is devoted to maintaining and increasing the physical efficiency of the

soldiers in the Armored Forces—especially the tank crews.

An Occupational Hygiene Branch has been established in the Division of Preventive Medicine in the Surgeon-General's Office to satisfy the responsibilities of the Army to its employees. This Branch maintains an active liaison with the various Army departments. It has undertaken two main activities:

1. Assignment wherever indicated of qualified industrial physicians to the Army-operated plants. These physicians are commissioned in the Medical Corps. Industrial physicians have also been assigned as industrial medical officers to the service commands. Industrial hygiene engineers have been commissioned in the sanitary corps and assigned where needed.

2. Establishment of an industrial hygiene laboratory located in the School of Hygiene and Public Health of Johns Hopkins University, whose main function is to study environmental conditions in Army-operated plants, make special inquiries and elaborate methods of controlling health hazards.

In supervising health conditions in the Army-owned, contractor-operated plants, the Surgeon-General's office has the assistance of the Division of Industrial Hygiene of the U.S. Public Health Service. In such plants the medical departments are not staffed with military personnel but are employees of the company physicians and their assistants.

Through these agencies the Army is providing to soldiers and civilian employees the benefits made available by the progress of industrial medicine and industrial hygiene in the last twenty-five years.

A. J. Lanza, Am. J. Pub. Health, 1943, *33*: 317.

How a Small Plant got Health and Safety Results

THE success in accident control achieved by the founder and president of the United Boiler Heating and Foundry Company of Hammond, Indiana, indicates the value of a program for safety which includes education, strict enforcement, effective long-range engineering and, above all, a grim determination on the part of management to see the job through.

In this plant, which had a particularly severe safety problem, preliminary studies indicated the prime causes, which included the lack of an efficient safety organization and safety thinking both by management and its men; inadequate controls against dust hazards; poor housekeeping; inefficient and dangerous methods of operating; and dangerous equipment.

Under the program set in motion, immediate attention was directed toward the removal of occupational disease hazards. In this phase of the program, management took the initial step toward protecting the health of the workers by giving each one a medical examination (including chest X-rays). Extensive efforts were made to remove dust, a regular schedule for cleaning the plant was instituted, and various details of equipment previously neglected were corrected. Following this, the company developed an effective program for the control of general plant safety. Their efforts, which consisted of routine cleaning the plant, removing scrap, repairing defective buildings and equipment, were not successful until it was realized that each individual employee must give interested co-operation. The desired effect was achieved by broadening the personnel of the safety committee to include the superintendent, all foremen and one man from each department.

The success of the program as conducted in this small plant is evidenced by a change from a 45 per cent debit on its insurance rate to a 10 per cent credit, and is typical of what can be achieved today by enlightened management.

Henry F. Becker, Occupational Hazards, February 1943, p. 14.

BOOKS AND REPORTS

Brucellosis in Man and Animals. *By I. Forrest Huddleson, D.V.M., M.S., Ph.D. Contributing authors: A. V. Hardy, M.S., M.D., Dr.P.H.; J. E. Debono, M.D., M.R.C.P., and Ward Giltner, D.V.M., M.S., Dr. P.H. New York: The Commonwealth Fund, 1943. 379 pages. $3.50 (U.S. funds).*

OVER one hundred new references have been included in the bibliography of the second edition of this authoritative book. Laboratory workers will note revisions of the sections dealing with Brucella dissociants, and with diagnostic procedures and aids, while a new feature is a detailed method for the determination of the virulence of a given culture in terms of its catalase activity. The clinician will find unchanged the valuable series of case histories, and the directions for general care of the patient with brucellosis. The conclusions have been brought up-to-date that "a satisfactory chemotherapeutic agent for human brucellosis belongs to the future", and that the most hopeful specific therapy is the production or maintenance of an allergic reaction through a series of injections of Brucellin. In view of the many diseases simulated by chronic brucellosis, and of the claim "that in the absence of a positive (blood) culture the only possible method of diagnosing the chronic form of the disease is the study of the combined results of a suitable allergic (Brucellergen) skin test, opsonic test and agglutination test", physicians and laboratory directors should familiarize themselves with the proper interpretations of these tests. Readily accessible supplies of Brucellin and Brucellergen would be helpful in enabling Canadian physicians to verify the author's claim.

The veterinarian will find well covered both the pathology of brucellosis in the various animal hosts, and the ramifications of the problems of eradicating Bang's disease by the identification and slaughter of reactors, or alternatively, by immunization. Public health workers living in the Fraser Valley of British Columbia, where probably one half the dairy cattle are infected with *Brucella abortus*, will not be surprised by the statement that Bang's disease is perhaps three times as prevalent in the United States as was bovine tuberculosis at the time its eradication was begun; and in view of the obvious impracticability of compensating farmers for the elimination of half their herds, will wonder why the more promising method of control through calfhood vaccination with strain 19 is not launched on a very large scale. Throughout Canada, human brucellosis is apparently almost entirely acquired through consumption of raw milk from cows infected with *Brucella abortus*. The age and sex incidence of the human disease are different in this country as compared with the United States, where there is a relatively high incidence of occupational brucellosis, exemplified particularly by *Br. suis* infections among packing-house employees in the mid-western states. Yet despite the relatively low infectivity of the genus Brucella by the oral route, *Br. abortus*-infected raw milk is probably the most common source of human brucellosis throughout North America, and is certainly the usual source in Canada. It is therefore astonishing to find no reference whatever to pasteurization of milk and milk products as a public health measure of prime importance in the prevention of brucellosis in man. This omission, and the statement that "the control or prevention of brucellosis hominis is a problem in animal hygiene and veterinary medicine", are together sadly significant of the sometimes differing viewpoints of the veterinarian and the public health worker.

C. E. Dolman